ZANZIBAR PROTECTORATE

ANNUAL

MEDICAL AND SANITARY REPORT

FOR THE

Year ended 31st December, 1937

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ANNUAL
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Year ended 31st December, 1937

Office of the
Director of Medical Services,

Zanzibar, 7th April, 1938.

Sir,

I have the honour to submit for the information of His Excellency the British Resident and for transmission to the Right Honourable the Secretary of State, the Medical Report on the Health and Sanitary Conditions of the Zanzibar Protectorate for the year 1937, together with the Returns, etc., appended thereto.

I have the honour to be,
Sir,
Your obedient servant,

W. LESLIE WEBB,
Director of Medical Services.

The Honourable,
Chief Secretary to the Government,
Zanzibar.

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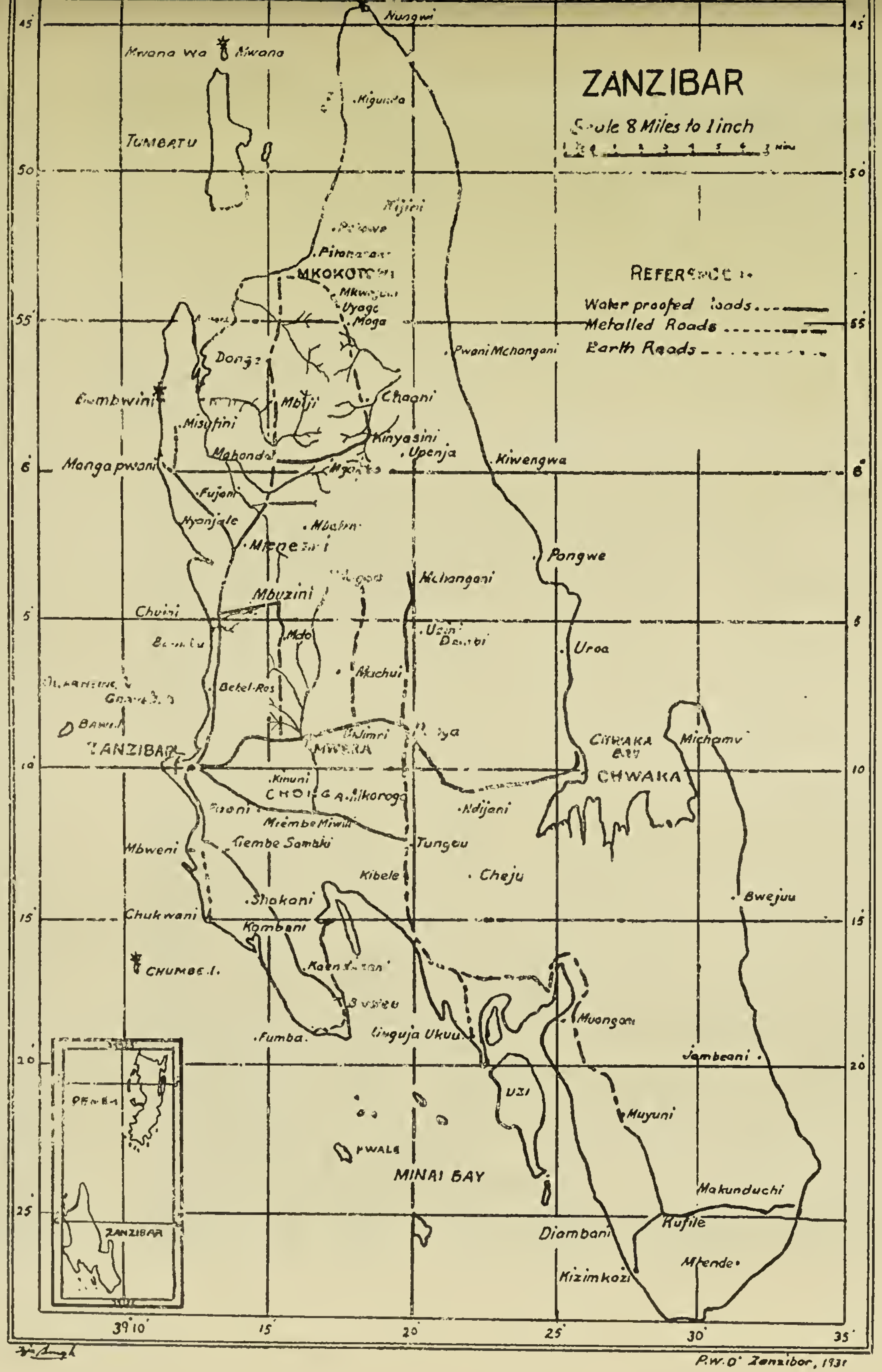
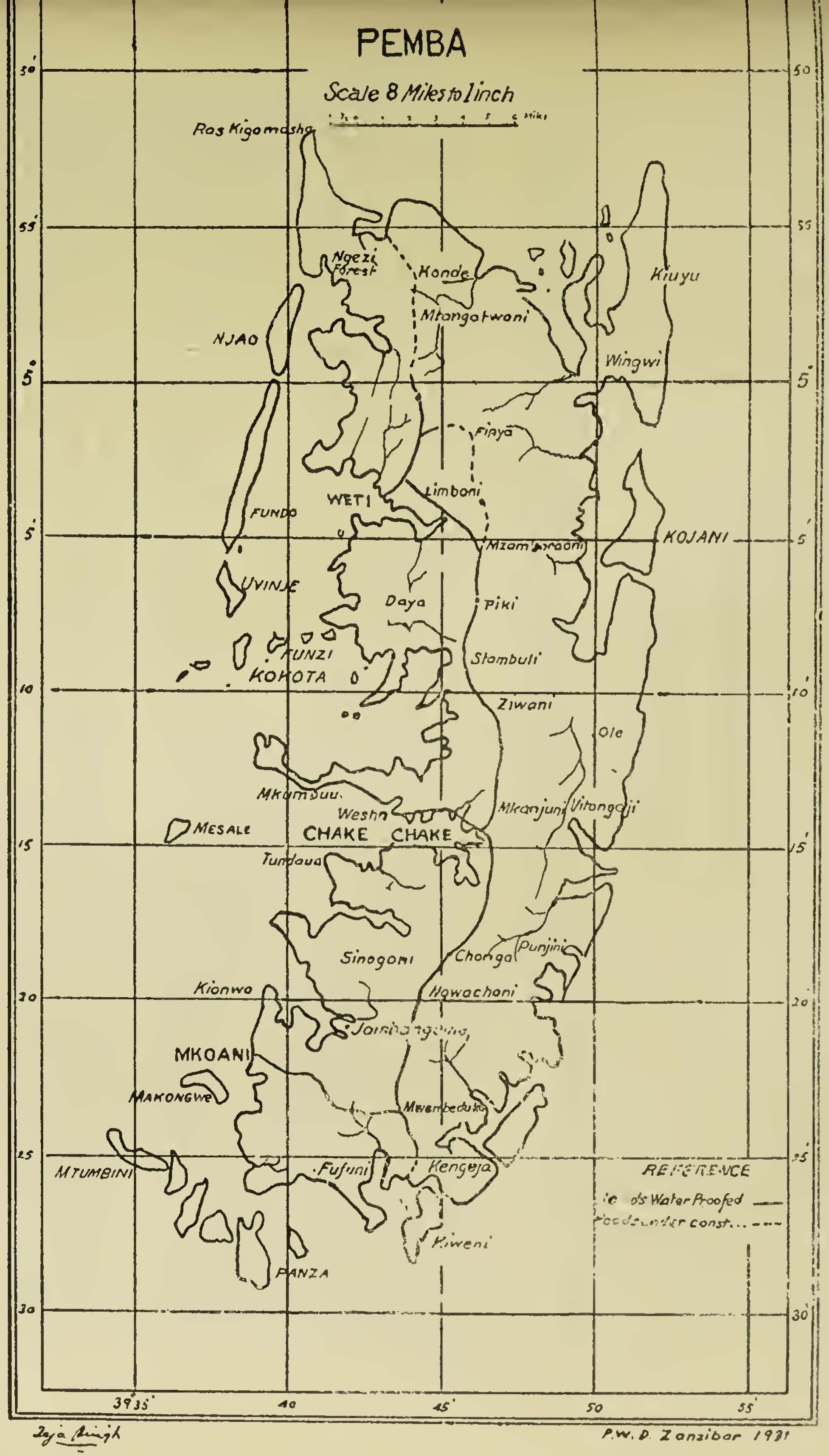

ZANZIBAR
Scale 8 Miles to 1 inch
REFERENCE
Water proofed Roads
Metalled Roads
Earth Roads
Nungwi
Mwana wa Mwana
Kigunda
TUMBATU
Mijini
MKOKOTONI
Mkwajuni
Moga
Pwani Mchangani
Donge
Bumbwini
Mbiji
Chaani
Kinyasini
Upenja
Kiwengwa
Misufini
Mahonda
Mangapwani
Fujoni
Nyanjale
Mbuzini
Pongwe
Chuini
Mchangani
Uroa
Mdo
Betel-Ros
Bawi
ZANZIBAR
MWERA
CHWAKA BAY
CHWAKA
Michamvi
CHOI
Mkorogo
Ndijani
Tungeu
Mbweni
Kibele
Cheju
Bwejuu
Chukwani
Shakoni
Kombeni
CHUMBE I.
Fumba
Unguja Ukuu
Muongoni
Jambeani
UZI
Muyuni
PWALE
MINAI BAY
Makunduchi
Kufile
Diambani
Mtende
Kizimkazi
PEMBA
ZANZIBAR
39°10'
15'
20'
25'
30'
35'
P.W.D. Zanzibar, 1931


PEMBA
Scale 8 Miles to 1 inch
Ras Kigomasha
Ngezi Forest
Konde
Kiuyu
Mtongatwoni
NJAO
Wingwi
Finya
FUNDO
WETI
Limboni
Mzambaraoni
KOJANI
UVINJE
Daya
Piki
FUNZI
KOKOTA
Stambuli
Ziwani
Ole
Mkumbuu
Weshn
Mkanjuni
Vitongoji
MESALE
CHAKE CHAKE
Tundaua
Sinogoni
Chonga
Punjini
Kionwo
Ngwachani
MKOANI
MAKONGWE
Mwembeduka
MTUMBINI
Fufuni
Kengeja
REFERENCE
Roads Water Proofed
Roads under const.
Kiweni
PANZA
39°35'
40
45'
50
55'
P.W.D. Zanzibar 1931

SECTION I.

ADMINISTRATION.

GENERAL REVIEW.

A short review of the more important events of 1937 is given below. Most are dealt with at greater length in the body of the report.

Vocational Training of Native Personnel.—A very great advance was made in the training of non-European personnel when nine learner Sanitary Inspectors, Indian, Goan and African sat for an examination held under the auspices of the Royal Sanitary Institute. Five of them satisfied the examiners, and will be issued with certificates in due course. It is believed that this is the first occasion in East Africa on which locally trained candidates have sat for this examination and the Senior Medical Officer, who organized and shared in the training and those officers of the Medical, Agricultural and Public Works Departments who assisted him are to be congratulated on the success of their efforts.

Even more important than the success in passing an examination, is the fact that this enterprise has made available African Sanitary Inspectors for permanent posting in rural areas, and by the end of the year three were actually so posted. This marks the first serious attempt to cope with the problem of rural sanitation and one that holds out every prospect of success.

A scheme for the formation of a Zanzibar Native Medical Service through the framework of which rural Africans could be given a comprehensive training in medical work with a view to subsequent absorption into the Department as rural dispensers, nurses and midwives, was approved by Government in 1935. There were at that time no rural Africans of a high enough standard of general education available for training and it was arranged with the Education Department to admit a number of boys and girls into the Government boarding schools with a view to giving them a general education up to Standard VI before their vocational training was commenced. At the boys' school at Dole at the close of the year there were two such classes of 16 each who were admitted during 1936 and 1937. The first class will have completed their general education at the end of 1939 and will be available for the Medical Department in 1940. There are in the Government Girls' School similarly two classes of African rural girls, numbering 14 and 8 the first of which will leave the school and it is hoped enter the hospital in 1942. During this year, however, six African girls and five boys were recruited whose standard of education allowed immediate vocational training and it is hoped that it may be found possible to start training within the Zanzibar Native Medical Service next year. It will not be possible to commence training on an extended scale, or satisfactorily until facilities for doing so are provided at the hospital. Hostels, lecture rooms, staff quarters and additional wards are required and it is hoped that it will be possible to devise a plan to provide these on the site of the existing hospital as an alternative to the scheme previously formulated for a complete new teaching hospital if it is found impracticable to proceed with this on account of cost. Adequately trained native staff remains one of the crying needs of the department, and it is difficult to see how any material extension of service can be effected without considerable cost until it is provided.

Rural Sanitation.—The three African Sanitary Inspectors referred to above have been posted to rural areas in connexion with a scheme for providing bore hole latrines for the whole population of a selected area as an experiment which it is hoped will be applied to the whole Protectorate if it proves successful. The scheme is fully referred to in Section III of this report, and represents not only an attempt at improving the general sanitary amenities of rural areas, but one which should also have a very far reaching effect on the ancylostomiasis situation of the Protectorate.

As these inspectors complete their work in connexion with this scheme and as more of them become available, it is intended that they shall devote themselves to other aspects of rural hygiene, such as housing, water supplies and malaria prevention. The experience they will gain whilst engaged in latrine construction and the fact that they will get to know and be known by the rural people, will be invaluable when the time comes for them to take up their extended duties.

Medical Services for Women.—During the year 1888 there was published in London the "Memoirs of an Arabian Princess", written by one of the daughters of Seyyid Said, the first Sultan of Muscat and Zanzibar to take up his residence in Zanzibar and dealing with events in Zanzibar about the years 1860-70. At the end of a chapter devoted to Diseases and Medical Treatment, with a vision far a head of her time, this enlightened lady wrote:

> "In conclusion, I should like to ask if it would not be more humane to import female physicians into Zanzibar instead of those horribly demoralizing spirituous liquors? Must corruption always precede civilization? There is a great opening here for Christian charity that would bear fruit a hundred fold without any obstacles in the way. For my part I am perfectly willing, in case a Society undertake to send out a qualified person, to instruct the same in Arabic and Swahili; this is the least service I can do my dear native home. But it must be a female physician; she will be able to do more good in the East than ten medical men combined. A kind woman with pleasing manners would be received with open arms by all Eastern ladies. She would not only find herself well rewarded but soon acknowledge herself that she is doing a good and charitable deed."

And so, long after the writer's death, it came about when the first lady doctor was appointed to the service in Zanzibar in 1936. The year 1937 marks the first full year's work and the results have been as anticipated. The women's out-patient department and special clinics are in a building entirely separated from the men. The staff is entirely of women and consists of the Woman Medical Officer-in-charge, a European Nursing Sister with a Health Visitor's qualifications, a dispenser from South Africa who also acts as bursar with a Comorian assistant, a Goan midwife, an assistant in training, a clerk and an ayah, all Africans. This staff at the out-patient department in Zanzibar alone dealt with 7,310 new cases and 45,306 attendances during the year. Perhaps the most striking testimony to the success of the venture is the difference it has made in the proportion of women to total cases attending. In Zanzibar this rose from 22 per cent in 1935 to 40 per cent in 1936, when the clinic started and to 59 per cent in the year under review. In the Pemba hospitals, where there is no woman doctor, the proportion has remained roughly constant at 23 per cent.

There can be no question of the importance of the work undertaken by this staff, not only in the relief of suffering, but in the contacts made for the first time with any representative body of women of Zanzibar, opening up new and very important channels of approach in questions of preventive measures, nutrition and child welfare. The extension of the activities of this unit to rural areas was initiated and successfully so but with very strict limitations imposed by the capacity of the staff to undertake further obligations. The island of Pemba, with a population of 95,000, remains untouched. These considerations have led Government to adopt the policy of appointing a second woman doctor to the service in 1938 with a possibility of a further appointment at a later date. The attempt of the department to influence the hygienic lives of the rural native through the agency of men doctors has not been entirely successful, partly due to the fact that the personnel employed in rural dispensaries was insufficiently trained to afford the relief desired, but mainly because the women held aloof from the male attendant and to a less extent from the male doctor. A policy of increased substitution of female for male staff to effect the desired raising of hygienic standards generally through the influence of the women and the home is one that merits serious consideration.

In the meantime in Pemba a start was made at the hospitals at Chake Chake and Wete, by providing the women with out-patient departments separated as widely as conditions permit from the men. The clinics were taken by the European Nursing Sister, and the Medical Officer was only referred to in cases of doubt. There are indications that this procedure is resulting in an increase in the number of women patients, but it is too early for this to be manifest yet.

Nutrition.—The publication of a "Nutritional Review of the Natives of Zanzibar" early in the year focussed attention upon this subject. It was clearly demonstrated in the review that native dietaries in Zanzibar are almost invariably lacking in some essential foodstuffs, and that the health of the native population generally suffers considerably as a result. There can be little doubt that a great number of the public health and preventive problems which abound in the Protectorate would be materially modified by a rectification of native dietetic habits and customs. It is in fact becoming more and more evident that the spear head of the attack on existing conditions to allow a raising of the hygienic standards of the general native population are those methods which we can employ to improve the nutrition of the native, and that other enterprises in preventive medicine are subordinate and ancillary to this. Unfortunately it is the most difficult of application, for not only is it necessary to devise means whereby the necessary foodstuffs are made available for the native at a cost that he can afford to pay, but it is equally necessary to create in him a desire for these articles. The effects of policies adopted to these ends must of necessity be slow of appearance. It is satisfactory that the importance of this aspect of preventive medicine is now recognized and that consideration is being given to methods designed to improve conditions as they exist.

School Medical Service.—A very satisfactory feature of the year has been the extension of the School Medical Service. Sixteen hundred children were medically examined during the year, whilst nearly thirteen hundred were seen by the dental surgeon. The findings however were not so satisfactory. Nevertheless, the service is well established through both islands and is now more willingly accepted by both parents and children. Treatment is afforded generally to all, and more advantage is being taken of it than in the past. With the introduction of the principle of providing the children with a meal at school, and with continued insistence upon the virtues of cleanliness and the necessity of oral hygiene there is little doubt that a great improvement in the health of the children can be anticipated in the not too distant future.

(A) STAFF.

Principal Appointments, Promotions, Changes, etc.

	Date.	
	From.	To.
Appointments:—		
Mr. I. S. Rutter, to be Dental Surgeon ...	1- 1-37	
Miss L. Thompson, to be Nursing Sister ...	21- 1-37	
Dr. W. L. Lister, to be Medical Officer ...	6- 2-37	
Dr. A. C. Pilkington, to be Medical Officer of Health and Port Health Officer ...	21- 2-37	21-11-37
Dr. H. G. Wiltshire, to be Medical Officer-in-charge, Zanzibar Hospital ...	2- 4-37	27- 6-37
Dr. E. J. Blackaby, to be Medical Officer ...	26- 6-37	
Dr. E. J. Blackaby, to be District Medical Officer, Pemba ...	3- 8-37	
Dr. D. D. McCarthy, to be Medical Officer of Health, Zanzibar ...	1- 9-37	21-11-37
Dr. S. W. T. Lee, to be Medical Officer of Health, Zanzibar	22-11-37	
Dr. D. D. McCarthy, to be Medical Officer ...	22-11-37	
Acting Appointments:—		
Dr. S. W. T. Lee, Senior Medical Officer to act as Director of Medical Services ...	21- 2-37	15-11-37
Mr. A. A. Madhani, Sanitary Inspector to act as Sanitary Superintendent ...	21- 2-37	15-11-37
Miss M. K. O'Shea, Nursing Sister to act as Matron ...	26- 7-37	31-12-37
Termination of Appointment:—		
Staff Sergent J. Elgie, Laboratory Assistant ...	29- 6-37	
Transfers:—		
Dr. H. G. Wiltshire, Pathologist, to be Senior Pathologist, Uganda ...	8- 9-37	
Dr. R. Nicklin, Medical Officer, Nyasaland ...	18- 9-37	
Secondments:—		
Dr. D. D. McCarthy, Medical Officer-in-charge of Anti-malarial Survey ...	1- 1-37	31- 8-37

(B) LEGISLATION AFFECTING PUBLIC HEALTH ENACTED DURING THE YEAR.

Government Notice No. 1	Standing Orders for the Zanzibar Town Sanitary Board—Public Health Decree (Cap. 60).
Government Notice No. 2	Standing Orders for the Pemba Town Sanitary Board—Public Health Decree (Cap. 60).
Government Notice No. 14	The Public Health (Appointment of Cemeteries) Order, 1937—Public Health Decree (Cap. 60).
Government Notice No. 15	The Public Health (Recognized Family Vaults) Order, 1937—Public Health Decree (Cap. 60).
Government Notice No. 16	The Public Health (Control of Oxen) Rules, 1937—Public Health Decree (Cap. 60).
Government Notice No. 18	The Public Health (Appointment of Cemeteries) (No. 2) Order, 1937—Public Health Decree (Cap. 60).
Government Notice No. 28	The Dangerous Drugs Order, 1937—Dangerous Drugs Decree (Cap. 64).
Government Notice No. 30	The Public Health (Appointment of Cemeteries) (Amendment) Order, 1937—Public Health Decree (Cap. 60).
Government Notice No. 42	The Dangerous Drugs (No. 2) Order, 1937—Dangerous Drugs Decree (Cap. 64).
Government Notice No. 49	The Public Health (Offensive Trades) (Copra drying, etc.) Order, 1937—Public Health Decree (Cap. 60).
Government Notice No. 50	The Public Health (Offensive Trades) (Copra drying, etc.) Rules, 1937—Public Health Decree (Cap. 60).
Government Notice No. 52	The Public Health (Appointment of Cemeteries) (No. 3) Order, 1937—Public Health Decree (Cap. 60).
Government Notice No. 53	The Public Health (Recognized Family Vaults) (No. 2) Order, 1937—Public Health Decree (Cap. 60).
Government Notice No. 55	The Public Health (Control of Oxen) (Amentment) Rules, 1937—Public Health Decree (Cap. 60).
Government Notice No. 56	The Public Health (Amendment) Rules, 1937—Public Health Decree (Cap. 60).
Decree	A Decree to repeal the Leprosy Decree (Cap. 63)
Decree	A Decree to amend the Public Health Decree (Cap. 60).

(C) FINANCIAL.

Table of Actual Expenditure.

	£	£	£	£
	1934	1935	1936	1937
Medical Department ...	37,846	36,575	38,098	40,427
Municipal Votes controlled by Medical Department	7,867	7,113	7,144	7,557
Grants-in-aid ...	1,675	1,716	230	230
Total ...	47,388	45,401	45,472	48,204
Total Revenue of the Protectorate ...	451,182	457,114	475,444	494,828
Percentage of Total to Total Revenue ...	10.50	9.93	9.56	9.74
Total Revenue of the Department ...	3,855	3,993	3,696	3,805

SECTION II.

PUBLIC HEALTH.

GENERAL REMARKS.

Returns for the Year.—Detailed figures appear in Table A, Section VI at the end of the report. A comparison between those for 1937 and past years follows:—

	1933	1934	1935	1936	1937
New cases ...	157,167	159,686	130,115	128,235	125,542
In-patients ...	4,815	4,463	3,853	4,413	4,673
Total Attendances ...	502,672	536,242	444,175	459,170	448,379
Surgical Operations (major) ...	1,320	1,299	1,151	1,016	954
Surgical Operations (minor) ...	2,340	3,370	2,683	2,295	3,220

The number of new patients continued to fall, and again the district dispensaries are principally responsible. The number of total attendances has also fallen considerably. This is almost certainly due to the fact that 1937 produced a record clove crop, the harvesting of which extended over a longer period than usual. During this period, the majority of the population are too busy to seek treatment for most minor and trivial ailments, with the resultant fall in the returns.

The proportion in which the two sexes attended for treatment at Government institutions has remained much as it was formerly, except in Zanzibar where the proportion of females attending has now exceeded that of males. This alteration can only be attributed to the activities of the Woman Medical Officer. These activities are still largely confined to the town of Zanzibar, but, as explained in Section V, have already expanded into the districts and to Pemba.

The relative proportions of the two sexes attending for treatment are shown in the following table:—

	1933	1934	1935	1936	1937
	%	%	%	%	%
Males ...	74.5	73.6	73.9	71.4	72.8
Females ...	25.5	26.4	26.1	28.6	27.2

The percentage of females at the three main hospitals during the past two years amongst the new patients were:—

	Zanzibar.	Chake Chake.	Wete.
	%	%	%
1935	22	27	19
1936	40	27	20
1937	59	28	18

The increase in Zanzibar is striking.

The principal causes of deaths in Government hospitals during the last five years were:—

	1933	1934	1935	1936	1937
Total deaths ...	387	446	418	470	476
Senility ...	103	127	75	135	136
Pulmonary tuberculosis ...	52	50	50	49	45
Pneumonia ...	15	26	20	29	42
Debility ...	26	19	41	19	18
Ancylostomiasis ...	16	10	17	13	10
Diseases of the Heart, Veins and Arteries	14	15	11	11	11
Malaria and Blackwater ...	6	14	9	17	7
Nephritis ...	8	10	4	17	9

Old age still remains the most fatal complaint and figures largely in the death returns because of the large number of aged people maintained in the Walezo Poor House.

The only figures which throw any light on the incidence of disease throughout the communities of the Protectorate, are, apart from vital statistics and notifications of infectious disease, those compiled from cases treated at Government hospitals and dispensaries. And while, through the medium of good roads and easy transport, many of those attending these institutions come from a distance, the vast majority are drawn from within a surprisingly small radius. In the case of the dispensaries, this sphere of influence is even smaller. Only too many of the district population still regard a hospital as a place to be avoided and, even when gravely ill, will readily sacrifice a good chance of recovery rather than be separated from their relations and their home. It was hoped that the dispensary service would materially assist in breaking down this prejudice, but such has not come to be realized. The poor attendances at so many of these units suggests that either the system, the personnel, or the people themselves are at fault, and a careful review of the situation is at present under consideration.

Three native Sanitary Inspectors have just been posted to rural areas. At the moment their work consists chiefly of propaganda combined with the supervision of the dispensers. The combination of the two may well result in closer contact between the native rural population and the Medical and Sanitary services concerned with their welfare.

I. GENERAL DISEASES.

The diseases treated at the Government hospitals and dispensaries during the last five years are grouped in percentages of cases treated in the following table:—

	1933	1934	1935	1936	1937
	%	%	%	%	%
Endemic, Epidemic and Infectious diseases	11	13	12	13	14
Nervous system ...	6	7	6	6	6
Respiratory system ...	7	7	8	7	8
Digestive system ...	26	27	30	26	26
Skin and cellular tissues ...	32	29	27	28	26
External causes ...	7	7	8	8	8
Others ...	11	10	9	12	12
	100	100	100	100	100

The Epidemic, Endemic and Infectious diseases group varies little from year to year in its relation to the total number of cases of all diseases treated. The largest numbers dealt with in this group were malaria, yaws and gonorrhœa.

The number of cases and deaths due to Epidemic, Endemic and Infectious diseases are shown in the following table:—

	Total numbers.	Epidemic, Endemic and Infectious Diseases.	Deaths.
1933	157,167	17,900	77
1934	159,686	19,833	90
1935	130,115	15,394	83
1936	128,235	16,638	99
1937	125,542	17,477	80

Here again there is little departure from the normal incidence.

General Diseases.—These numbered 2,159 with 17 deaths compared with 2,107 and 11 deaths in 1936.

Anæmia, 745 cases, and chronic rheumatism 321 cases, were the most common diseases in the group and as they were diagnosed almost entirely by rural dispensers, the presumption is that most were cases of ancylostomiasis and gonnorrhœal arthritis.

A number of cases of avitaminosis and malnutrition were seen but, as the model report is not framed to include these diagnoses, such cases are entered in Table VI under item 40.

Affections of the Nervous System.—This group totalled 7,564 with 14 deaths compared with 7,672 cases in 1936. Diseases of the Eye formed the largest subdivision 3,354 as compared with 3,566 in 1936. Other minor affections such as headache, neuralgia and insomnia accounted for 1,860 cases compared with 2,053 last year.

At the eye clinic in Zanzibar, 1,044 new cases were treated and 8,968 re-attendances were dealt with. Sixty operations, mainly for cataract were performed.

Affections of the Circulatory System.—1,031 cases were recorded, as against 767 in 1936. Diseases of the lymphatic system with 659 cases formed the largest group, and were due chiefly to filarial infection.

Affections of the Respiratory System.—10,972 cases were seen against 9,437 in 1936. Coryza 2,777 and acute bronchitis, 5,788, overshadowed all the others in this group.

Diseases of the Digestive System.—With 32,511 cases, this forms the second largest group of diseases, although the numbers dealt with are smaller than in the previous year when 33,783 cases were seen. The most important conditions are tabulated below :—

		1935	1936	1937
Constipation	...	12,539	9,985	8,852
Ancylostomiasis	...	13,665	12,608	12,196
Dental Caries	...	6,386	6,184	6,251
Colic	...	668	616	1,107
Affections of the pharynx	...	1,366	1,046	1,164
Ascariasis	...	164	195	192

Ancylostomiasis still accounts for the largest number of cases. Yet this number is small when it is realized that over 90% of the inhabitants harbour these worms.

Diseases of the Genito-urinary System.—3,568 cases were seen as against 3,087 in 1936. Schistosomiasis, ulcers of the penis, orchitis and hydrocele were the chief complaints.

Diseases of the Puerperal State.—These conditions treated in Government hospitals reached a total of 302 as compared with 115 in 1936. The figures from the Zanzibar Maternity Association are not included in the above.

Affections of the Skin and Cellular Tissues.—These totalled 32,952 cases, a decrease of 3,385 on the figures for 1936. Ulcers of various sorts totalled 21,973 ; this head includes minor septic cuts and abrasions—most of which are not of a disabling character. The large indolent "tropical" ulcer appears to be less common than it was some years ago. 5,446 cases of scabies are recorded, being 1,538 less than in 1936. Almost all these cases are a mild form of mycotic dermatitis—Acarus scabies is extremely rare.

Diseases of Bones and Organs of Locomotion.— These numbered 3,187 compared with 3,047 in 1936. Minor complaints accounted for 2,187 of these cases.

Malformations.—16 cases are recorded—the majority being talipes.

Diseases of the Infancy.—171 cases were seen of which 84 were normal living babies born in hospitals. These figures show an increase of over 100% and 40% respectively. A further indication of the success of the women's Clinic.

Affections of Old Age.—407 cases were recorded and most were dealt with at the Walezo Poor Infirmary.

Affections produced by External Causes.—10,432 cases were seen as compared with 10,604 in 1936. Most were minor cuts, bruises and contusions a few only were of a serious nature.

Diseases due to Ill-defined causes and Diseases which have not caused 10 Deaths.—These totalled 1,058; due mostly to debility from unstated causes, and 2,520 of which P.U.O. formed the majority. Both show a decrease on the numbers for the previous year.

II. COMMUNICABLE DISEASES.

(*a*) Mosquito or Insect-Borne.

Malaria.—The relative incidence of malaria in the Protectorate is seen from the following table:—

	1933	1934	1935	1936	1937
Total number of cases of malaria treated in all Government hospitals ...	7,536	9,796	6,902	7,666	8 806
Percentages of malaria cases to all diseases treated ...	3.67	6.13	5.31	5.97	7.00

The number of cases of malaria dealt with in the Zanzibar town hospitals during the last five years has been:—

1933	1934	1935	1936	1937
3 580	4,473	2,452	1,635	2,409

The increase in cases observed in 1937 does not indicate an increase in intensity, but is dependent upon other factors which are discussed in Section III.

Blackwater Fever.—Two cases were reported. In 1936 the number reported was 17 and in 1935—4.

Filariasis.—The total number of cases shown in Table VI does not represent the true incidence of the disease, as many of the conditions are tabulated as deep muscle abscesses, hydrocele, etc. The crude incidence of microfilaria in the blood of natives is 24%.

(*b*) Infectious Diseases.

There was no outbreak of any serious infectious disease during the year and the cases dealt with at Government hospitals during the past five years are tabulated below:—

	1933		1934		1935		1936		1937	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Small-pox ...	3	—	—	—	—	—	—	—	—	—
Chicken-pox ...	25	—	76	—	68	—	29	—	43	—
Morbilli ...	—	—	—	—	105	—	24	—	—	—
Rubeola ...	—	—	—	—	1	—	6	—	8	—
Whooping cough ...	201	—	70	—	81	—	173	—	94	—
Mumps ...	75	—	42	—	27	—	76	—	62	—
Diphtheria ...	—	—	—	—	5	2	—	—	4	—
Dysentery ...	73	5	69	—	48	7	50	4	61	3
Enteric group ...	6	—	8	3	21	2	8	—	3	—
*Tuberculosis ...	244	52	202	50	161	70	208	50	201	48
*Leprosy ...	47	2	50	11	21	8	136	17	137	13
Yaws ...	4,935	—	4,343	—	4,192	—	4,689	—	4,188	—
*Syphilis ...	446	2	446	4	716	—	1,200	3	1,062	4
Soft chancre ...	67	—	44	—	49	—	47	—	65	—
Gonorrhœa ...	1,662	2	1,698	—	1,602	—	1,566	—	1,465	—
Influenza ...	984	—	2,216	—	793	—	558	—	1,098	—
Tetanus ...	3	1	4	2	6	2	6	2	5	1

*The figures include cases remaining in hospital from the previous year.

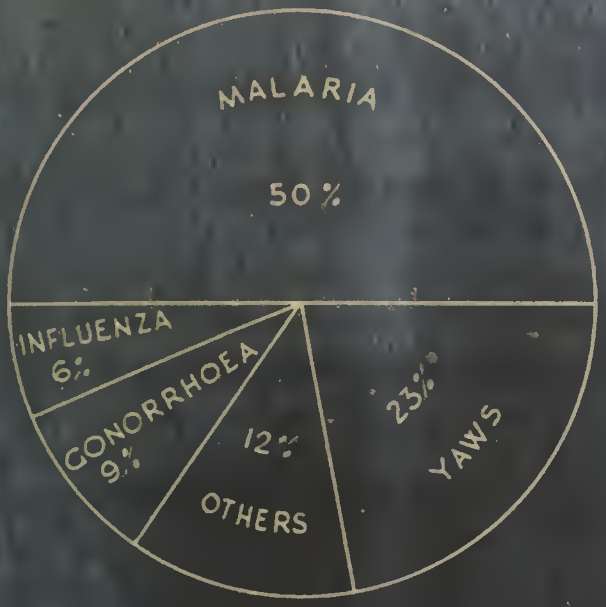
Enteric Group.—Only three cases were seen at Government hospitals, but 18 positive Widals were reported by the Pathologist. Fifteen cases were treated by private practitioners.

Whooping Cough.—94 cases were treated in hospitals mostly at the clinic for Women and Children. Their distribution throughout the year was fairly uniform and there were no deaths.

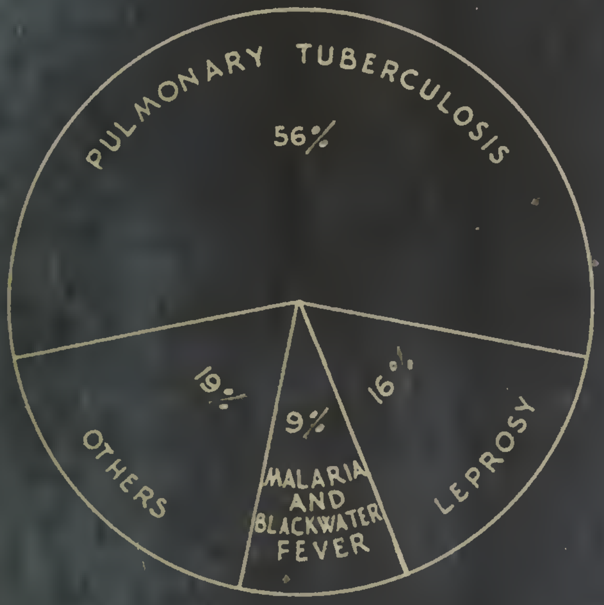
Ulcers.—21,973 ulcers cases were treated during the year—a slight decrease on the number for the preceding year.

Dysentery.—61 cases were seen. Five of them being of the amœbic type. The Pathologist comments on the type of bacilli isolated. There were three deaths due to the disease.

The Proportion of Epidemic Endemic and Infectious Diseases.

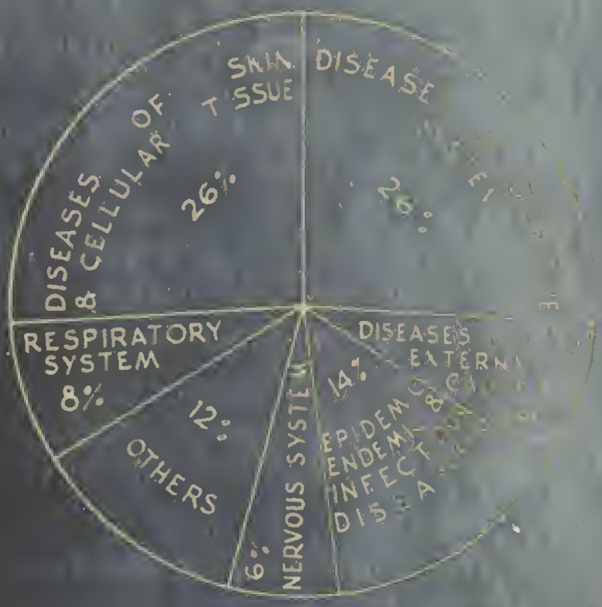


Total Incidence - 17,477

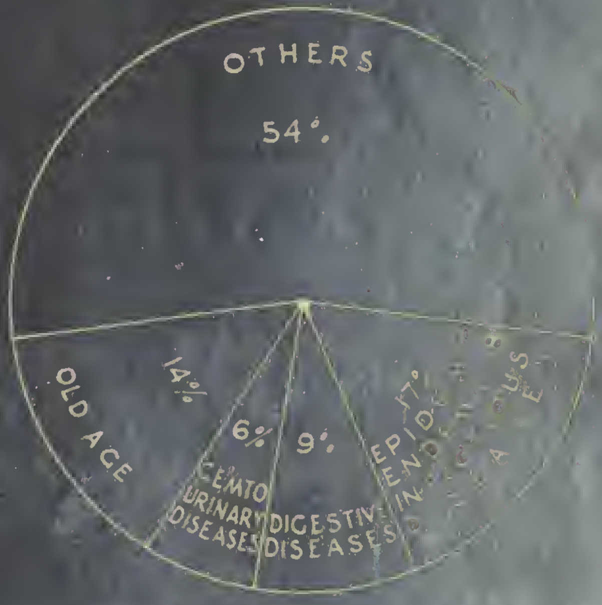


Total Deaths - 80

The Proportion of Epidemic, Endemic Infectious, Systemic and other Diseases shown as Percentages of Total Cases.



Total Incidence - 125,542



Total Deaths - 476

Influenza.—The number of cases recorded 1,098 showed a marked increase over those of the previous year—558. The cases were of a mild type and no deaths were reported.

Syphilis and Yaws.—The number of cases of syphilis treated in 1937 was 1,062—a slight decrease on those of the previous year. 4,188 cases of yaws were treated during the year, also a slight decrease on the number for the previous year. The incidence of these diseases is discussed in a later section.

Gonorrhœa.—1,465 cases of gonorrhœa and its complications were seen during the year. This gives no idea of the incidence, for almost every adult has the disease. The disease as a whole is of a mild type and little significance is attached to it by the indigenous population, who seldom concern themselves sufficiently about it to attend for treatment.

Tuberculosis.—201 cases were dealt with during the year, a figure which varies little from year to year. The cases are almost entirely pulmonary in type and occur almost exclusively in early adult life.

(*c*) HELMINTHIC DISEASES.

Ancylostomiasis.—12,196 cases were reported as against 12,608 in 1936. Practically every native in the Protectorate harbours these worms, but true clinical Ancylostomiasis is not as common as might be expected. It is however frequently the deciding factor which changes the picture from one of parasitic equilibrium to one of pathological significance. General measures are being undertaken for its diminution. These are explained at length in a later section.

Schistosomiasis.—576 cases were reported as against 550 in 1936. It is widespread in Pemba but less so in Zanzibar. Intestinal forms of the disease are rare practically all being of the urinary type. Like ancylostomiasis this disease is remarkably well tolerated by the Natives of the Protectorate, who, apart from passing bloody urine and complaining of occasional pain, suffer so little discomfort that most prefer to put up with the disease rather than submit to the tedium of treatment.

(B) VITAL STATISTICS.

I. POPULATION.

The estimated population in the Zanzibar Protectorate at the end of 1936 was 242,578. During the year 4,139 live births and 4,026 deaths were registered; there were 15,531 immigrants and 14,530 emigrants so that the estimated population at the end of the year was 243,692 an increase of 1,114. The previous year an estimated decrease of 339 had occurred.

Mid year.	Estimated population.	Birth Rate.	Death Rate.
1931	237,000	19.7	19.5
1932	240,000	18.9	19.3
1933	244,000	18.8	15.1
1934	244,000	18.3	17.6
1935	243,500	14.9	16.6
1936	242,770	16.3	16.8
1937	243,135	17.0	16.9

Birth and Death Rates.—The above figures are compiled from vital statistics returns submitted by the Mudirs through the Provincial Administration and cannot be regarded as even approximately correct. Faulty registration alone can account for the marked discrepancies and variations which occur in the various Mudirias. Registration is not carried out by many, the locally nomadic habits of the population rendering it difficult to check up on all births which occur.

These figures tend to bear out the suggestion made in previous years, that the population of Zanzibar if not reinforced periodically by an excess of immigrants over emigrants, may be diminishing. Though the above figures do not warrant the drawing of a definite conclusion it would appear that the margin of natural increase—if any— is smaller than the limits of safety would prescribe.

Infantile Mortality Rate.—The rate calculated from the official returns is for all communities; but there is every reason to believe that this rate is far from the truth. The rates obtained from observations carried out in 1935 varied from 100 to 275 per 1,000 live births. One of the same areas, kept under observation during 1936 showed an infantile mortality rate of 161. This investigation was continued throughout 1937 and gave rates of 141 for natives and 159 for Indians per 1,000 live births.

Maternal Mortality Rate.—The registered figures give a rate of 9.2 per 1,000 live births as compared with 5.3 in 1936 and 8.6 in 1935. The probability is that all of these are much too low as they are derived from the town only, where conditions are superior to those in the districts.

Still Birth Rate.—The registered still births give a rate of 1.7% compared with 4.2% for 1936, that is, the percentage of still births to still births plus live births. The surveys quoted in 1935 gave the rate as 14%. From observations made at the Welfare Clinic during 1937, 29 still births occurred out of a total of 418 full term births among Indian women—a rate of 6.9% whereas out of a total of 991 native full term births 86 still births occurred giving rate of 8.7%.

General.—All the rates quoted above, as compiled from official statistics and registers, are seen to be open to doubt. The investigations at the Welfare Clinic are being continued so that by the end of 1938 sufficient figures should be available to afford fairly accurate data from which the Infantile and Maternal Mortality and Still Birth Rates may be calculated. For the compilation of accurate Birth and Death Rates, more accurate registration is required and this can only be possible when the villagers and their headmen realize that every death and every birth must be recorded.

II. EUROPEAN OFFICIALS.

The officials included in Table A and B below are those whose names appear in the Protectorate Staff list only. Wives and families are not included.

Table A.

Showing the sick, invaliding and death rates of European officials during the last three years:—

	1935	1936	1937
Total number of officials resident ...	97	102	110
Average number resident ...	69.62	69.51	69.60
Total number on sick list ...	180	151	159
Total number of days on sick list ...	979	981	709
Average daily number on sick list ...	2.68	2.68	1.94
Percentage of sick to average number resident ...	3.85	3.85	2.61
Average number of days on sick list for each patient ...	5.43	6.49	4.46
Average sick time to each resident ...	10.09	9.62	6.44
Total number invalided ...	—	—	—
Percentage of invalided to total residents ...	—	—	—
Total deaths .	—	2	1
Percentage of deaths to total residents .	—	1.96	0.9
Percentage of deaths to average number residents . .	—	2.88	1.44

The most common diseases were :—

Influenza ...	24
Diseases of the digestive system ...	14
Local injuries ...	13
Malaria ...	11
Diseases of the skin ...	10
Diseases of the respiratory system ...	8
Debility ...	4

No Medical Boards were held on European officials during the year.

Deaths.—One death occurred during the year.

Duodenal Ulcer ...	1

III. EUROPEAN NON-OFFICIALS.

178 European non-officials reported at Government hospitals as compared with 162 for the previous year.

The principal causes of sickness were :—

Diseases of the digestive system ...	19
Local injuries ...	18
Diseases of the skin ...	13
Diseases of the respiratory system ...	8
Influenza ...	8

Deaths.—One European non-official died during the year.

Cerebral Hæmorrhage ...	1

IV. NON-EUROPEAN OFFICIALS.

Table B.

Table showing the sick, invaliding and death rates of non-European officials during the past three years :—

	1935	1936	1937
Total number of officials resident ...	496	475	462
Average number resident ...	446.3	430.73	423.48
Total number on sick list ...	306	268	264
Total number of days on sick list ...	2,281	2,456	1,753
Average daily number on sick list ...	6.25	6.71	4.80
Percentage of sick to average number resident ...	1.40	1.55	1.13
Average number of days on sick list for each patient ...	7.45	9.16	6.64
Average sick time to each resident ...	4.60	5.17	3.79
Total number invalided ..	9	5	5
Percentage of invalided to total residents ...	1.82	1.05	1.07
Total deaths ...	2	—	—
Percentage of deaths to total residents ...	0.4	—	—
Percentage of deaths to average number residents ...	0.45	—	—

The most common diseases were :—

Influenza ...	67
Malaria ...	55
Diseases of the respiratory system ...	20
Diseases of the digestive system ...	20
Diseases of the skin ...	12
Diseases of the genito-urinary system ...	8

Medical boards were held on eight Asiatic officials of whom five were permanently invalided for the following causes :—

Cerebral Hæmorrhage ...	2
Diabetes mellitis ...	1
Pulmonary Tuberculosis ...	1
Hypochondria ...	1

SECTION III.

HYGIENE AND SANITATION.

A. GENERAL REVIEW OF WORK DONE AND PROGRESS MADE.

I. PREVENTIVE MEASURES.

(*a*) Mosquito or Insect-Borne Diseases.

Malaria.—The Anti-malarial Survey conducted by Dr. D. D. McCarthy under a grant from the Colonial Development Fund was completed in September 1937 and his report is expected to be ready for publication early in 1938. In the meantime the following is an advance summary of some of his main findings.

The 1934-35 period of the survey was devoted to the investigation of malaria in and round the town of Zanzibar, with periodic excursions into the districts, with the idea of deciding on suitable rural areas for later investigation and of collecting data from rural areas for comparison with those from the town during the same period. Throughout the whole period search was made for all breeding places within the town and a watch was kept on those already discovered. At the same time houses were regularly searched for adults and as many of the females as survived were dissected for infectivity.

In Zanzibar Town the malaria seasons of 1934 and 1935 were fortunate from the point of view of a survey, for in 1934 there was practically no control while in 1935, intense control operations were in force and meteorological conditions were closely similar. During the season of the rains 66% of anopheline breeding places were rain pools, next in order of frequency being hoof-marks with 12%; swamps, wells and excavations together making up 15%; and sundry others, seepages, streams, etc.—making up the remaining 7%. The rain pools however existed as breeding grounds only for three months of the year, whereas hoof-marks were found breeding anophelines for eight months out of the twelve.

The Town of Zanzibar may be likened to a quadrant of a circle with its apex or centre to the West jutting into the sea, the North and South radii being sea beaches, whilst the Eastern periphery or circumference is the landward side. Permanent breeding places were situated along the periphery of the town and consisted of swamps, shallow wells, streams and seepages in cultivation—in this order of frequency.

The importance of this peripheral breeding is demonstrated by the anopheline house infestation figures taken radially across the town from the centre of the circumference to the apex. In round figures the concentrations of female anophelines per house in a periphero-central direction for the *wet* seasons were :—

1934	(uncontrolled)	4.00	3.00	2.00
1935	controlled	1.00	.05	.03
1937	controlled + environs controlled	.30	.04	.09

At the same time the infectivity rate of the mosquitoes increased to a very marked degree from the periphery of the quadrant to its apex or centre from 4.2 per cent infected at the periphery to 21.1 per cent at the centre, so that at the apex of the town—though the chance of being bitten by an anopheline is normally fairly remote—in the event of one being bitten the probability of being infected is greater.

Amongst the native urban population the incidence of malaria, as judged from the parasite and spleen rates and from the morbidity rate, is high and shows marked seasonal and annual variations. These variations are not confined to the town alone but appear to occur in the rural areas where breeding and anopheline infestation remain more or less uniformly constant. This cyclical intensity of malaria is peculiar. Over the period of investigation, the parasite rate was 59.7% for children and 15.25% for adults. According to age the parasite rate rises rapidly towards the end of the first year of life remaining high (70%) for the next 4 or 5 years and after the age of 6 years steadily falls until the age of 16 or 17 to the adult figure of 15% where it remains.

The infestation rate differs from this in that though the rise from 0-1 year is equally rapid, the degree of infestation falls rapidly at 5 years and thereupon remains at the low adults level. This sudden fall probably marks the completion of the development of immunity—and the onset of the period of immune infestation.

All species of Plasmodia are present in Zanzibar Town. P. *falciparum*, P.*vivax*, P. *malariæ* and P. *ovale*. The most common is P. *falciparum* with a general incidence of 70-80%, P. *vivax* 10-20% and P. *malariæ* 5-10%. P. *ovale* which is included among vivax returns, occurred as 4.3% of these inefctions.

With regard to human infectivity the crude gamete rate found in the series was 4.2% with the highest rate for the youngest age group 0-5 years. This was 8.5. Thereafter there was a steady decline. The adult rate was 0.9% of infected persons.

The "Splenic Index" and "Average Spleen" produce very similar curves both seasonally and over the various age groups. The "Average Enlarged Spleen" or "Size Index" produces marked seasonal fluctuations but the annual figure over a period of years appears fairly constant, with perhaps a slightly declining tendency.

A large number of hæmoglobin percentages were taken and on being correlated with the spleens for size and rate per age were found to be inversely proportional. This is more marked in the case of spleens of size I and II (Schüffner). and though the degree of anæmia continues to increase with spleens size III and IV, it does so less abruptly.

The effect of the measures taken is illustrated in the anopheline infestation figures for 1936-37 set out above.

The rural part of Zanzibar is divided physiographically into two portions: the heavily wooded well-watered and fertile portion to the north-west of the central ridges and the arid inhospitable zone of coral plain to the south and east. The north-west zone carries the greater proportion of the population and yet makes up only two-fifths of the island's total area.

In 1934-35, the high malarial intensity recorded in the town was shared by the island generally, as evidenced by the very high degree of infestation found, and the parasite, spleen and sporozoite rates. This intensity diminished steadily from 1934 to 1937 for there was a gradual decline in all indices throughout this period with but slight rises during the wet seasons.

In the north-west areas the mean anopheline infestation rate for 1936-37 was 5.4 per house with a range of 3.73, the highest rate occurring in April-June. The sporozoite rate at the same time averaged 3.2%. During this period July 1936-June 1937, the parasite rate declined from 80% to 55% with but a slight rise in November-December with the little rains. The spleen index at the same time dropped from 70% to 40%.

In the arid coral plains of the south and east in 1934-35 the spleen rate was 77.5 whereas by 1937 it had fallen to 48.8. After the rains in 1934 adult anophelines were extremely scarce (house infestation 0.2) and during the rains of 1936 and 1937 were even rarer—0.03 per house. Transmission in this area is at all times very low, and for long periods may be in complete abeyance. The amount of malaria in the population is probably almost entirely due to the mass migration to areas of heavy infestation, of families during the periods of the clove harvest and were it not for this it is more than probable that malaria in this area would be almost non-existent.

PEMBA.

In general malarial conditions in Pemba closely approximate those existing in the north-west portion of Zanzibar, but have if anything, a slightly greater intensity and appear to be subject to less variation.

During the rainy season of 1936 parasite and spleen rates for the three township areas were as follows :—

	Parasite Rate. %	Spleen Rate. %
Wete	80.7	79.8
Chake Chake	68.5	77.1
Mkoani	60.0	100.0

In all three townships the anopheline house infestation rate remained high throughout the period of investigation, the average being 4.3 per house. The highest recorded was from Chake Chake in March and April 1937—14.6 per house—and the lowest from Wete in January and February—0.6 per house.

The sporozoite rate for the island over the whole period was 3.3%—fluctuating from 6.2% in Wete (September-October 1936) to 2.7% in Mkoani at the same time.

Over all the areas examined there was a marked numerical predominance of *A. funestus* over *A. gambiæ* due largely to the topographical features of the country, its abundance of vegetation and the breeding habits of the former mosquito.

Within the townships themselves the amount of anopheline production is small—the danger for the most part comes from without. The townships are so small in extent, however, and the intensity of the malarial onslaught crowds in upon them so closely as to nullify the effect of the precautionary measures which have been taken within the municipal boundaries, by reason of the tremendous infiltration which is continually going on. But by a steady and uniform centrifugal extension of all effective anti-malarial measures these townships could in a few years be rendered almost free from active transmission.

The "Splenic Index" for the town of Zanzibar for the period 1934-35 was 59.7% as compared with 68.6% for the rural areas, a difference which in no way reflects the difference in the "malariousness" of town and rural areas.

Preventive Measures Taken in Zanzibar Township.—Anopheline control within the township is reduced in the main to :—

(1) Removal of rain and storm water as quickly as possible from the low lying potential swamps.

(2) Locating all small rain pools and treating them with oil.

(3) Prohibiton of cattle grazing in the swampy areas as long as the surface is soft and water-laden.

(4) The abolition of all surface wells within the town area and on the boundary and replacing them with stand-pipes or pumps.

(5) Clearing the stream beds along the Northern boundary of the town.

(6) The prevention of infiltration from the town by forming a "controlled buffer belt" half a mile in width beyond the municipal area. This has the effect of lowering the infestation which occurs from infiltration alone and this again reduces the rapidity with which breeding places within the town are stocked.

As regards item (3) cattle have now been removed from the old dairies within the township to new ones situated about one mile outside the town boundary and they are allowed to graze in the township only at such times and in such places as the Medical Officer of Health permits.

With regard to item (4) it is intended in 1938 to extend the pipe-borne water supply to the native areas and on to the boundary so that people will not have to store water or use wells.

As regards item (6) anti-malarial control is now being extended to a distance of half a mile outside the town boundary.

No town planning scheme for native areas of the town was drawn up during the year so that no roads, drains and covered sewers can be provided which would allow of the abolition of sullage pits and pit latrines in which culicine mosquitoes are so frequently found breeding.

Anti-malarial drainage was laid in the town to the extent of 2,000 feet.

The high average and constant rainfall during the last quarter of the year made mosquito control difficult especially in relation to grass cutting and bush clearing. Owing to the large amount of labour picking the large clove crop, owners of private plots had great difficulty in obtaining labour for the above purpose.

Preventive Measures Taken in the Pemba Townships.—The control of malaria in the Pemba townships presents numerous difficulties owing to the nature of the land which contains large numbers of ravines which become swampy both from storm and seepage water from the surrounding hills. The anti-malarial measures have been chiefly of a temporary nature.

(*a*) *Permanent.*—This was handicapped by difficulty in obtaining labour owing to clove-picking and the required supervision during the latter part of the year. Efforts have largely been concentrated on the making of agricultural drains to be laid in 1938.

Plans have been drawn up to deal with the swamps surrounding each of three towns next year as far as possible.

Following the passing of a law to remove cattle from township areas, this has been done.

(*b*) *Temporary.*—Grass cutting and bush clearing gangs have been inadequate in numbers to compete with the rate of growth. A total of 6,700 yards of anti-malarial drains were kept clear during the year. Mosquito searchers made collections of larvæ in an around the towns. The number of collections seems small compared with the general prevalence of adult mosquitoes, but with the provision of extra men in 1938, it is hoped, by efficient training, to increase the number of breeding places found and deal effectively with them.

As far as staff permits holes have been filled, sullage and latrine pits oiled, and Paris green thrown on swamps. Temporary drains have been dug in the South swamp at Mkoani with satisfactory results.

Dengue.—No cases were notified in the Protectorate during the year.

Filariasis.—This diseases occupies a prominent position amongst diseases affecting the natives; elephantiasis, deep seated abscesses and hydrocele are common.

The following table shows the number of occasions on which mosquito larvæ were discovered within the Zanzibar township boundaries by the searchers.

	1932	1933	1934	1935	1936	1937
Stegomyia	3,298	2,388	2,793	2,637	3,368	3,839
Culex	873	544	601	382	228	108
Anopheline	179	38	164	107	32	7

(*b*) EPIDEMIC DISEASES.

Plague and Cholera.—Neither of these diseases has appeared in Zanzibar within recent years. Rats are trapped regularly in the townships of the Protectorate. 9,214 being caught in Zanzibar this manner. Of these 953 were examined, including several dead rats which were found near the Customs, none of which showed traces of plague. In addition 7,986 rats were caught in the three townships in Pemba.

Smallpox.—No cases of this diseases occurred in the Protectorate during the year.

8,805 vaccinations were performed in Zanzibar and 1,918 in Pemba making a total of 10,723. All immigrants and emigrants were vaccinated unless they showed scars of recent vaccination.

Enteric Fever.—22 cases were notified in the Protectorate during the year. All occurred in Zanzibar Town except two, one being a case of paratyphoid fever in Wete, Pemba. Cases occurred during all months of the year with the exception of May, June and November. The sanitary conditions existing in

Zanzibar at present are such as to facilitate a spread of the disease; the milk supply is also a potential source of danger. Improvements in the former are continually being made, but it must be a long time before the conditions will approach an ideal standard. During 1938, it is intended to improve the purity of the milk supply, by putting in proper drainage and affording means of sterilizing milk cans at the Government dairy. Only one carrier of typhoid is at present known in the township; this carrier left the Protectorate for a time but returned. The law does not allow for any restriction to be placed on typhoid carriers.

Dysentery.—56 cases were notified in the Protectorate of which 36 were in Zanzibar, including one European, as compared with 33 cases including one European in 1936. One of the Europeans was a naval rating aboard H.M.S. *Enterprise* and the disease in this case was probably contracted in Tanganyika Territory. Seven of the Zanzibar cases were of the amœbic type, the others being bacillary. 29 of the cases occurred in Zanzibar Town and the other six in the country. 20 cases were reported from the Wete area of the Pemba District. It is probable that there were more cases in the country areas which did not come under medical attention, as the insanitary conditions of the clove pickers temporary camps favour the spread of the disease as happened in Pemba in 1936.

Relapsing Fever.—*Sp. recurrentis* were found in the blood of one patient in Pemba. The movements of this case were unknown, but it is certain that the disease must have been contracted outside the Protectorate, probably in Tanganyika Territory; the tick, *Ornithodorus moubata* is not known to exist either in Pemba or Zanzibar.

Cerebro-spinal Meningitis.—One case was notified from Wete in Pemba.

Tuberculosis.—151 new cases compared with 204 in 1936 were notified nearly all being of the pulmonary type. Of these 125 were in Zanzibar Island and the remaining 26 in Pemba, 18 of which were in the Wete area. One of the Wete cases was tubercular meningitis. Of the Zanzibar cases 85 were resident in the town, 38 from the rural areas outside and two were imported from Tanganyika Territory.

There would appear to be a marked decrease in the number of cases in the Protectorate since 1932, when 238 cases were notified; this may be due, to some extent, to improvement of sanitary conditions in housing. There is a tuberculosis colony at Walezo on high ground outside the town and whenever possible natives suffering from the disease are persuaded to live there for treatment and at the same time foci of infection are removed from their homes. Some of the earlier cases improve considerably under rest, fresh air, better feeding and treatment of concomitant diseases, and in some cases the disease has become quiescent. Unfortunately, in the majority of cases the disease is of an acute caseating type and runs a much more rapid course than one is accustomed to see in England.

Leprosy.—28 new cases of this disease were notified during the year compared with 35 in 1936 and 23 in 1935. The two leper colonies at Walezo in Zanzibar and at Makondeni in Pemba are well patronised by the lepers, who go to reside there voluntarily and without need for compulsion. The presence of a leper in a village is usually objected to by the other inhabitants, and they often render assistance in bringing cases to the notice of the mudirs and through them to the medical officer of the district. It is probable therefore that most of the cases come to the notice of the medical officers, and are voluntarily segregated in one or other of the two colonies. Particulars of these colonies are given in Section VII (E and F) of this report.

(c) HELMINTHIC DISEASES.

Ancylostomiasis.—During the years 1927 and 1928 the late Dr. Mansfield Aders Economic Biologist to the Government at that time, undertook a comprehensive survey of the ancylostome situation in the island of Zanzibar and published his results in the Annual Medical Reports of those years. During the course of his investigations he examined over 1,000 stools obtained from representative communities throughout the island and established the fact that 98 per cent of the population were infected with hookworm. The average infestation for the whole island was between 3,000 to 4,000 eggs per gramme of fæces but it was demonstrated that far heavier infestations occurred in the North and central parts of the island than in the South with its dry climate. It was noted that clinical manifestations of the infection were not usual in those individuals whose fæces yielded less than 10,000 eggs per gramme, and were by no means invariable in those who yielded far larger quantities· Of the series examined 9 per cent showed an infestation rate of 10,000 eggs per gramme or over, so that it might be expected that the number of the general population manifesting clinical signs of the disease would be less than 9 per cent. He also established that in 92 per cent of the cases the infecting agent was *Necator americanus* and in 8 per cent *Ancylostoma duodenale.*

Subsequent investigations and enquiries have all tended to support these findings and there can be no doubt that nearly the whole of the population of the island of Zanzibar is infected with hookworm, and that clinical manifestation of the disease is recognisable in an unknown but definite number of cases, varying with locality. The condition of almost universal infestation must inevitably contribute to that state of sub-normality which is so manifest in the local native, and any scheme of universal applicability which would contribute towards the diminution of the infectivity or infestation rates or which would create a set of conditions favourable to the success of a subsequent campaign against the disease, would be a public health measure of great importance. Such a measure would be the provision of suitable latrines throughout the island, because it is through the use of ground surface for defæcation, which is almost universal in rural areas, or of unsuitable latrines that the mass infection is maintained. It has been suggested by the investigations undertaken by the Pathologist that unsuitable latrines are an even more potent source of infection than the habit of surface defæcation for those provided with earth tops, and these are the commonest, the earth, fouled with excreta and kept damp by washing water, provides so favourable an environment for the concentrated breeding of millions of larvæ, that few who use them can hope to escape infection. Latrines covered with cement tops on the other hand he found to be infected only on very rare occasions, even under bad conditions of light and ventilation, except in certain cases of shallow pits where the larvæ were able to hatch out in the pit and make their way to the surface. In no case of deep pit latrines with cement tops and sheltered by superstructures which admitted light and air, were larvæ to be found.

The provision of such latrines universally, if they proved acceptable to the native, would thus diminish infection and re-infection rates in proportion to the extent to which they were used, and would in the course of time, diminish the percentage of those suffering from the infection. The question was to find a suitable and efficient type of latrine which could be constructed at little expense. In 1935 Iwan auger bottoms were obtained and fitted to a locally made boring apparatus, tripod and winding gear at a cost of about £22.10. At the same time a cement latrine top was designed and made in some quantity at a cost of about Shs. 3 each. At this time it was intended that after suitable propaganda, Government should offer to dig a pit for any householder for nothing and sell him a latrine top at cost price. During 1936 this policy was proceeded with, with only moderate success, owing partly to the unsuitability of the boring apparatus then in use, but mainly to the fact that whilst most natives who were approached were pleased and willing to have a latrine pit dug for them for nothing, none were prepared to pay Shs. 3 for a slab. A fairly large number of pits were dug and fitted and proved eminently satisfactory for the purpose for which they were intended. In the latter part of 1937, Government adopted the policy of supplying the cement top free to all as well as digging the pit for nothing and new life thus given to a movement which up to then had not given much promise of success· The boring apparatus was overhauled and after many experiments a satisfactory alternative to the costly and rather impractical one then in use was devised at a cost of about £8 each, whilst the cement latrine top was lightened and redesigned until it could be produced in quantities at Shs. 2 each. It now appears likely though it is too early to be certain yet, that a pit can be bored for about Shs. 2 and fitted with a cement top for the same cost, making a total of Shs. 4 for the completed pit without superstructure.

The accepted policy of Government is to provide sufficient latrine accommodation in a selected area towards the North of the island, to ensure that facilities exist within the villages for defæcation of the whole population concerned into latrines. The Government as stated before, will dig the latrine and fit the cement top free, leaving the householder to provide the superstructure. Generally this will mean providing each house with a latrine to the number of 3 to 4 thousand at an estimated cost of £800. Later, consideration will be given to the provision of accommodation for workers in the clove plantations and the rice fields. The policy will be restricted solely to the provision of this accommodation, and will not include investigation into the effects such provision will have upon the incidence of hookworm infestation, which would be beyond existing resources, nor any form of mass treatment, which would be undesirable for the present. It is therefore, in so far as hookworm is concerned, an uncontrolled experiment, but we already know from Dr. Aders researches the extent of the disease, the life history of the parasite is known, and the effect of disposing of infective material below the ground is assured; and in years to come, if it is then considered desirable, the degree of success achieved can be assessed by investigation. It is therefore not an experiment in hookworm control, but an experiment to ascertain to what extent the application of proved methods of control is practicable in Zanzibar,—will the native make use of the facilities provided, is the type of latrine the most suitable for the purpose and the cheapest, and can the boring apparatus be cheapened or improved? If the experiment provides satisfactory answers, the road is open to apply the principle generally to the whole Protectorate at a cost which is approximately estimated at £15,000.

By the end of the year, six boring machines were at work in the area in experimental borings under the charge of three African Sanitary Inspectors whom it was found possible to post to this rural area. Efforts were being made by them to popularize the use of latrines and they were lecturing on the subject at rural schools, markets and outside mosques, whilst 40,000 pamphlets in the vernacular were printed and were being distributed. So far, there is every indication of the experiment proving successful, for generally the native has shown no evidence of any deep seated distrust or dislike of using a latrine instead of the ground, and in the great majority of cases has evidenced a preferance for the latrine and expressed gratification at being provided with one. Great reliance must be placed on the trained African Sanitary Inspector, permanently posted to rural areas, to follow up the preliminary installation of the latrines and to see that the people use them and keep them in repair.

Ascariasis.—Is common over much the same areas as hookworm and it is hoped that anti-hookworm measures will effect a reduction in its incidence.

Schistosomiasis.—A research worker from the London School of Tropical Medicine has been engaged during the year on an investigation of the bilharzia situation in Zanzibar and Pemba· By the end of the year the snail carrier had been incriminated and the fact ascertained that its distribution in Zanzibar is limited by certain definite factors. The hold this snail has on existence is thought to be precarious and it is possible that further research will enable the London School to put forward concrete recommendations for the total eradication of the disease from the Protectorate.

II. GENERAL MEASURES OF SANITATION.

(a) Sewage Disposal.

(*i*) *Zanzibar Stone Town—West of the Creek.*—Present day methods were described at length in the report for last year and little alteration has occurred during 1937. One new public latrine, with septic tank, has been built and approximately 75 premises have installed septic tanks and connected up with the public drains. These numbers are not large but the rate of drain laying, for financial reasons, is slow and it will be many years before Zanzibar town is provided adequately with sewers.

Considerable progress has been made in converting existing public latrines to the septic tank system and almost all the buildings to the West of the peninsula forming the stone town have ceased to discharge crude sewage on to the sea shore. This has been effected without much trouble as it has been mostly Government buildings such as the hospital, Residency, schools, etc. which were affected or else houses belonging to people with sufficient sanitary education to make them desirous of abandoning the former methods. The cessation of the discharge of crude sewage both in this area and others must have an effect on fly borne diseases —but not until the still prevalent practice of the natives of using the beach as a latrine dies out. This practice is difficult to stop as only a few dozen of the 3,000 houses in the stone town have latrines provided for servants and no European quarters, except five, are known to possess such elementary amenities. In consequence where public latrines are not convenient the beach or narrow lanes must be used and the former is the lesser evil.

Each year one or two public latrines are built but progress is slow.

In some areas of the town the ground in which cesspits have functioned for years appears to have become soured and so saturated that the effluent from these tanks is no longer absorbed. This necessitates the very frequent emptying of the pits, generally by hand, if a sanitary nuisance is to be avoided, and the expense is great. The solution of the problem is the extension of the drainage system.

(*ii*) *Zanzibar Native Town—East of the Creek.*—Sewage disposal in these areas has remained unchanged. The shallow pit latrine is universally used and it advertises its presence in each house. Till the day when a town plan is declared and the native town is planned and roads, sewers and water are put in, there is no hope that the pit latrine can be abolished. They are the cause of much smell, some mosquito breeding during the rains and occasionally overflow but, on the whole, it is better to have them than to have the people of the town defæcating all over the streets as happens in other parts of the world.

(*iii*) *Rural Areas, Zanzibar.*—As detailed in Section III, I (a) a small scale attempt has been started to deal with sewage in the rural areas. It will be extended during 1938 and there is reason to hope that gradually deep pit latrines will be installed all over both islands. The decision of Government to dig pit latrines for every house holder free of cost and to provide a cement slab to cover the latrine may induce even the conservative Zanzibar native to make use of latrines.

(*iv*) *Pemba Townships.*—(*a*) *Wete.*—The vast majority of latrines are of the pit type and work fairly satisfactorily. Public latrines in the township number three, and in the near future it is hoped to add two more with flushing system and septic tanks, one in the town and one at the wharf.

All the European houses have water closets connected to cesspits, and during 1937 nine subordinate houses have had their buckets converted to water sanitation and a septic tank installed. This leaves only eight bucket latrines in the town; four at the Public Works Department lines, one at a subordinate house, and three at the prison. It is recommended that a septic tank be provided for the two former, and pit latrines for the latter, thereby abolishing the bucket system completely from the township.

(*b*) *Chake Chake.*—There are two septic tanks in Chake, and both are situated in private houses, the effluent being discharged into a storm drain in one case and in the other into a tidal stream entering the creek.

Distributed over some 800 huts in the township are about 500 pit latrines. European quarters are all provided with flushing system and cesspits.

There are four public latrines of the water closet type emptying into cesspits. Two of these latrines were closed towards the latter end of the year on account of being completely filled and time was required for the pump from the Public Works Department, to be repaired. These latrines led to an enormous multiplication of flies which became an absolute plague. Vigorous treatment, the destruction of breeding grounds and treatment of the offending cesspits reduced their numbers considerably. The disposal of night soil in the prison leaves much to be desired. At present ordinary drums are used as a bucket system, and these are emptied every day. A flushing system introduced and the erection of a septic tank for the prison—hospital, etc., would be a great and needed improvement.

(*c*) *Mkoani.*—Six bucket latrines are in use in the township. If the proposed water supply materializes, it will be possible to replace these with water closets.

(*b*) SCAVENGING.

In Zanzibar street scavenging over a total length of road of 56¼ miles was carried out by the staff of the Health Office. It is, perhaps, a peculiar activity for the Medical Officer of Health to engage upon but it has the merit that his Sanitary Inspectors who are in charge of the town districts are able to deal direct with headmen and sweepers who do not keep the roads clean. The system works well and the town roads were kept extremely clean during the year. The gradual fitting of fixed refuse bins in strategic positions may make it possible to keep the streets even more clean as it will be practicable to prosecute persons throwing fruit refuse and papers about the streets, once the litter bins are fixed in place.

In Pemba street cleaning and scavenging in the townships is the responsibility of the Medical Officers and this year additional sweepers and carts were allocated for this work, as it had not been carried out with marked success in the past. Refuse bins have also been fixed in prominent and busy places in Chake Chake and Wete. In addition Pemba Medical Officers took over the responsibility for keeping the markets clean in the same way as the Medical Officer of Health looks after the Zanzibar market.

In two or three of the smaller stations the District Officers are responsible for the cleanliness of the streets.

(*c*) REFUSE DISPOSAL AND REMOVAL.

The system was continued during the year whereby the Medical Officer of Health in Zanzibar and the Medical Officers in Pemba were responsible for street cleaning and refuse removal in towns.

Approximately 100 tons of refuse and road sweepings are collected daily in Zanzibar and disposed of by controlled tipping which caused no nuisance on account of fly breeding, because the low lying damp ground of the tip provides no suitable place for the pupation of fly larvæ.

Propotionately less refuse was collected in Pemba townships and was disposed of either by incinerator or by filling in low lying swampy land.

(*d*) DRAINAGE.

Some new work was done in Zanzibar where a number of subsidiary open cement storm water drains were put in as an anti-malarial measure. Closed drains were installed in the town in accordance with an approved programme of work whereby it is intended eventually to provide the whole town area with drains to take septic tank effluent and so to abolish gradually all cesspits and sullage pits. The length of new drains laid, 1,550 yards, is governed by the funds available, but at the present rate it will be many years before cesspits and sullage pits can be abolished in favour of septic tanks.

In Pemba townships very little anti-malarial drainage was installed but a large number of agricultural pipes were made in readiness for the inception of a fairly large scale anti-malarial drainage scheme in 1938. There are no other drains in Pemba—except of the storm water type and they are generally reasonably efficient, even if often in disrepair. More are required in every town but in the absence of roads it is not possible to provide them. Further improvements are dependent on the town planning of each township.

(e) WATER SUPPLY.

In Zanzibar the supply was ample and satisfactory in every way during the year for the areas where water mains are laid. In the native town and in the suburbs the situation remains as in former years—in the absence of declared roads the Public Works Department will not lay water mains so that the bulk of the population of the town have to employ water carriers to bring water to their houses.

To a small extent this difficulty is met each year by the provision of a few extra stand pipes on the outskirts of the native area, but this is merely a palliative measure—the cure is the laying of mains through the whole of the native town so that water is readily accessible to everyone.

In Pemba the supplies to Chake and Wete continued good, if interrupted rather frequently by breakdowns in the pumping plant. In Mkoani the presence of a large European, Asiatic and African staff in connexion with the land survey has caused endless trouble owing to a chronic water shortage. The existing supplies are of poor quality and are not sufficient in quantity for even the normal small population. Some reliance is placed on tanks but spells of dry weather made it necessary to employ a water cart to bring water into the town and, on one occasion, to send water up to Mkoani by ship.

The Public Works Department carried out experimental borings during the year and it is anticipated that the present unsatisfactory state of affairs will be remedied in 1938.

In the rural areas there was no change in the traditional methods of obtaining water from deep and shallow wells and small rivers. District Sanitary Inspectors are instructed to improve water supplies when possible.

(f) OFFENSIVE TRADES.

These trades gave little trouble during the year but copra making was declared to be an offensive trade in order that some control could be exercised over the many new plants which have sprung up in Zanzibar town. In the absence of town planning scheme and a zoned area for offensive trades there is nothing to prevent any offensive trade being set up in any area and this has happened in the case of copra dryers and cannot be stopped.

(g) CLEARING OF BUSH AND UNDERGROWTH.

In all townships this work was carried out under the control of the Medical Department.

In Zanzibar some 1,500 head of cattle which used, formerly, to graze all over the town were evicted during the year to new cattle sheds outside the town boundary. This resulted at first in a considerable overgrowth of grass and bush in the town, particularly on privately owned land the owners of which have had to learn that it is their responsibility to keep their land in a sanitary condition. The actual growth of grass and bush hides mosquito breeding places, conceals old tins and coconuts where stegomyia larvæ hatch out, and also prevents the discovery of filth in which flies tend to breed in large numbers. Combined with somewhat abnormal rains the long grass and bush led to increased numbers of flies and mosquitoes (not anopheline) in the town during the last two months of the year—but by the end of December everything was more or less normal and it is not expected that there will be any further trouble next year.

In Pemba townships tend to get overgrown during the rains, but it was agreed late in the year to hand all available prisoners over to the medical department for grass cutting and it is expected this increased labour will result in less flies and less mosquitoes in towns.

Prisoners in Zanzibar have been allocated for grass cutting and started work in December. Although they do not get through as much work as paid labour yet there are more of them and the total work done will make it improbable that Government owned plots and public land gets overgrown in future.

(h) Sanitary Inspection.

In 1937 four learner sanitary inspectors were added to the staff so that by the end of the year it became possible to post sanitary inspectors permanently in rural areas. It is intended to increase their numbers still more and to add 8 more to the establishment in 1938 so that it will be possible in 1939 to post sanitary inspectors to all of the larger rural areas. Their duties have been mentioned in Section III, I (a) and in addition to anti-hookworm measures they will carry on routine sanitary work in connexion with water supplies, disposal of refuse and excreta, improving lighting and ventilation of houses, notification of infectious disease, abolition of nuisances, etc.

The routine work of sanitary inspectors in towns went on as usual in Zanzibar and Pemba and was very satisfactorily carried out in the face of many difficulties. The chief of these are that few town dwellers have any social conscience and the poorer class Indians and most Arabs have none at all; everything, therefore, that is done to improve sanitation is carried through in the face of determined opposition even by those who are most likely to benefit by the measures introduced. Even routine work which has gone on for years, such as the weekly inspection of houses for mosquito larvæ, collection of refuse from refuse bins, control of persons throwing refuse into the streets or allowing waste water to flood the neighbourhood, has its opponents. The most disgusting nuisances of all, overflowing cesspits, are tolerated to a remarkable extent by the Zanzibar people and sanitary notices to deal with this type of nuisance often evoke the most virulent opposition and general misrepresentation because the abatement of such a nuisance costs money as porters have to be hired to bail out the pit.

III. SCHOOL HYGIENE.

During 1937 one thousand six hundred and twelve school children were examined in Zanzibar and Pemba. This number was made up as follows:—

Zanzibar Rural Schools ...	582
Pemba Rural Schools ...	324
Government Central School ...	493
Government Girls' School ...	213
	1,612

This is the largest number of school children that has ever been examined in the Protectorate in any one year.

In addition to the school clinic in Zanzibar town, where sick-parades of the school children are held daily, the school medical service has been extended to the rural areas of both islands where treatment is now a regular feature; many female children attend the Woman Medical Officer's Clinics in Zanzibar and rural dispensaries at Mwera, Selem and Mkokotoni.

Fewer difficulties were met with during the course of the examination than in past years and this is due to the fact that the children are becoming less suspicious of visits from a medical officer since this has become a routine.

Of the 582 children in Zanzibar Rural Schools 376 had been examined in 1936. As treatment had been given for any existing diseases, following the examination in 1936, an opportunity was afforded of noting the improvement or otherwise that had occurred in the children's physique during the twelve months. In some cases the improvement was marked and at one school (Kizimkazi) the Head Teacher commented upon the striking general improvement in his pupils. As is to be expected it was found that re-infection occurred in the pupils who were treated for ancylostomiasis, but anæmia was less evident in these boys than previously.

The state of nutrition of the children was carefully studied and signs of avitaminosis looked for and noted.

Malnutrition is grossly evident amongst the rural African children in Zanzibar and Pemba, less so amongst the rural Arabs, while the Arab boy who lives in the town is usually well nourished. The African living in the town is better nourished than are his fellows living in the rural areas but he is not so well fed as the town Arab. Malnutrition is less evident amongst the girls at the Government Girls' School than amongst male children. It has been noticed that female children in rural villages who do not attend school often present a more healthy appearance than the boys and the reason is that by staying about the house they pick up scraps and additional meals which the boys do not get.

Avitaminosis in children is extremely common, again chiefly amongst the rural Africans. By avitaminosis is meant the pathological conditions which result from living on a diet which is deficient in vitamins and is "ill balanced", that is one which contains disproportionate amounts of proteins and carbohydrates as this detracts from the value of the vitamins. The more common signs and symptoms of this complex syndrome are xerophthalmia, dirty eyes, aphthous patches at the corners of the mouths, sulphur flaking of the skin, night blindness, staining of the skin, and peripheral neuritis. In one school (Muyuni) sixty per cent of the boys exhibited marked signs of vitamin deficiency. In the town school avitaminosis is much less evident, whilst in the girls school only four pupils exhibited signs of vitamin deficiency.

The fact that avitaminosis is rare amongst the Arab town children, is not uncommon amongst rural Arab children and is present in about forty per cent of rural Africans is due to the difference in the financial resources of the different races concerned and to their dietary habits. Thus the better class Arab family can afford to eat meat and fish and buy ghee whilst the average rural dweller, Arab or African, can rarely afford meat and fish is eaten usually only twice or three times a week and frequently dried fish is used. The only fat the poorer people use is "tui", which is obtained by squeezing the oil from the flesh of a coconut into water. The local methods of cooking tend to destroy most vitamins as, for example spinach (*mchicha*) cassava leaves (*kisamvu*) and bananas, all of which contain vitamin A are boiled for long periods in several changes of water—and each time the water is thrown away.

The deficiency of vitamin A in the native diet is shown by the frequency with which xerophthalmia, lesions of the skin and mucous membranes are encountered in the children. These symptoms disappear quickly on administration of daily doses of cod liver oil, but their prevention is more difficult as the native is not impressed when he is told to eat more vegetables and fresh fruit, which can be obtained without much difficulty or expense. It is the custom, too, for the rural natives to send to the market anything which has a cash value such as fowls, eggs, or milk, virtually none of these commodities being retained for home consumption and, of course, the children are seldom or never given these important foodstuffs on account of their cash value.

The value of sufficient food and a well balanced diet is shown by the physical condition of the boys at the Rural Middle Boarding School Dole where no cases of avitaminosis were seen except for three boys who were new comers. Amongst the Dole boys the gain in weight during one year was remarkable, in many cases. Many of the boys gained over 14 lbs. while in the rural schools amongst children of the same age it was found that five or six lbs. represented the average gain for 12 months and many lost weight or failed to gain. Concurrently with the examination and as a simple experiment two orphan children in Walezo Poor House aged 2½ and 7 years respectively—both of whom showed classical signs of Vitamin A deficiency were given half a pint of fresh milk daily together with a teaspoonful of cod liver oil. After ten days the lesions of the mucous membranes had healed and after five weeks night blindness was no longer complained of. The average gain in weight per month was 2 lbs. in the case of the elder boy. The younger child did not show a constant gain as he developed malaria. These findings are of interest in view of the decision of Government to provide a daily meal of milk for the pupils of three rural schools in 1938.

With the exception of the children in the Government Central School, the Girls School and to a lesser extent Dole School the cleanliness of the school children leaves a great deal to be desired. Here again, as with nutrition, the financial situation of the parents plays an important part, but the influence of the teachers has a great deal to do with the matter. At the Government Central School and the Girls School cleanliness is the rule; in the rural areas the majority of the boys of Muyuni, Donge and Mkwajuni schools in Zanzibar and of Ubondwe school in Pemba were franky filthy, both their bodies and their clothes; conversely at the schools at Kombeni, Makunduchi and Kizimkazi, in spite of the fact that dirty clothes are nearly as prevalent as elsewhere, the boys were clean bodily and for this credit must be given to the teacher in these three schools.

Scabies is a common skin disease in the rural schools of Zanzibar and Pemba—much less so in the Town Schools. At the moment treatment is ineffective owing to the filthy state of the kanzus (long cotton garments) worn by the boys.

Provision has been made by the Education Department in the Estimates for 1938 to supply kanzus to boys who are suffering from scabies. These garments will be worn during school hours enabling the boys' own kanzu to be washed. In 1937 many of the boys were wearing the "tatters" of the kanzus they had worn in 1936.

In all the Protectorate schools dental caries is very common—about 92% of the pupils showing defects. As stated in 1936 this is due to neglect of the teeth and avitaminosis. All the schools are now visited regularly by the Dental Surgeon and beneficial results from his visits have resulted where the parents of the children have agreed to his recommendations and allowed their children to be treated. The dental surgeon states in his report that of the 1,278 children examined by him—92% require dental treatment.

He says "it is a rare thing to see a clean mouth free from food debris; until this condition is remedied, the percentage of children with dental disease, will remain extremely high. Furthermore it would appear that the Education Department Circular No. 12/1935 is being ignored". The Circular referred to instructed the Head Teachers of the various schools to supervise a daily teeth cleaning parade of the pupils.

Diseases of the nose and throat are not common amongst the school children of the Protectorate. Those seen were nasal polypi and tonsillar enlargement—the latter is surprisingly rare with the high percentage of septic mouths seen, coupled with the low Vitamin A content of the diet.

Pathological conditions of the external eye are frequently met with and in 1937 angular conjunctivitis formed the bulk of these defects. The "dirty" eyes of avitaminosis are common in those schools where malnutrition is more evident and some cases of trachoma were seen usually amongst Arab children.

Diseases of the ear were much less frequent than in 1936 due to the fact that treatment had been administered following the medical examination in 1936.

Evidence of organic diseases of the heart was met with only in a small percentage of the total number of children examined. The ætiology is uncertain because acute rheumatism does not appear to occur amongst the inhabitants of these islands, in spite of their constant exposure to wet weather and subsistence on a poor nutritional diet with a consequent lowering of resistence to infection of this kind. Hæmic murmurs due to marked anæmia are common.

Of the diseases of the lungs, simple bronchitis was the only one noted.

Amongst the school children the splenic rate and malarial parasite infestation is highest in Pemba where malaria is more prevalent than in Zanzibar, due to the nature of the country causing collections of water in ravines and swamps.

The splenic and malarial parasite infestation rates are high in the girls school in Zanzibar, but the explanation is that the majority of the children in this school are under ten years of age. The figures for the Zanzibar Rural Schools, which are almost identical with those of 1936, are not as high as might be expected but the examinations in both years took place during the dry season when malaria is less prevalent. In the Government Central School the figures are the lowest of all as malaria is uncommon in Zanzibar Town.

As in 1936 Laboratory investigations were carried out on the stools of the pupils. but the percentage (43% Swahilis, 38% Arabs) found to harbour ova of ancylostome in their stools cannot be taken as reliable, as it was discovered substitution had taken place in some instances. It may be assumed that ancylostomiasis is universal in the rural areas and the number of boys exhibiting signs of anæmia, shortness of breath, etc. bears out this assumption.

Ascariasis was found to be common especially in the Southern area in the schools on the east side of the island of Zanzibar the incidence was higher than that of hookworm. This fact may be due to the lower rainfall and sandy soil of this part of the island so that shady and moist places are less common and conditions are not very favourable for the development of the hookworm larvæ in the soil. In the town schools ancylostomiasis is lower.

The total percentage of positive Kahns for 1937 is lower than in 1936 due to a course of anti-specific treatment having been given to all the rural boys who were found to have positive Kahn reactions in 1936. It is satisfactory to note that practically all of these boys gave a negative reaction this year. Again no case of florid yaws was seen amongst the pupils, the majority of infections of yaws appear to take place before the school age. Two classical cases of congenital syphilis were seen.

The town school boys returned a much lower percentage of positive Kahns than did the rural boys. This is doubtless due to the fact that Yaws is much more prevalent in the country districts.

Urine was not examined for ova of bilharzia as a routine measure. The areas where children are likely to become infected are well known and many pupils of schools in these areas suffer from hæmaturia. The treatment of this disease is difficult as a long course of injections is necessary with a drug which causes unpleasant symptoms and, in practice, it is found that an ill nourished rural child will not tolerate antimony or emetine. It is impossible to get most children to attend regularly for a full course although, at the rural middle school at Dole, a full course of treatment was given to a few boys who were found to be suffering from schistosomiasis. Their symptoms have disappeared in the majority of cases but one or two continue to have obstinate hæmaturia.

In Pemba during the year an attempt was made to treat school children at Chake Chake with emetine. This was done owing to the long course of treatment necessitated by treatment with antimony tartrate injections and resulting sloughing of the tissues at the site of injection owing to the difficulty of getting the drug into the vein in young children and leakage of the drug from the vein.

Forty-five pupils, including three girls were given emetine treatment for Bilharziasis during 1937. Half a grain of emetine hydrochloride was injected intramuscularly daily for four days and one grain daily for twelve days consecutively. The course lasted sixteen days and each patient received a total of fourteen grains of emetine.

No untoward symptoms were noticed. The urine of each patient was examined after the course, four patients were found passing Schistosome eggs (9%).

An interesting case was of a young boy of the Friends Industrial Mission who received ten intravenous injections of antimony tartrate at Mkoani hospital (½ grain per diem for twenty-five days). He was still passing ova in his urine at the end of his course. At Chake Chake hospital he received a course of emetine. Small and transient symptoms passed off after the sixth injection and the urine became free from schistosome ova after ten injections (gr. viii).

A study of the nutrition and cleanliness of the rural school children in Zanzibar and Pemba makes it apparent that they are generally uncared for by their parents, partly as a result of ignorance and partly on account of neglect.

The solution of the problem of malnutrition amongst the children appears to be in the education of the people to make more use of the protective foods that are available such as fresh fish, fruit, milk and vegetables and later to increase supplies by more intense cultivation, and cattle keeping. At present the majority of these commodities are sent to the markets in the towns and it is certain fresh foods, meat and milk will only be consumed to any extent by the people when they are really cheap and accessible to everybody; no amount of propaganda will influence consumption whilst prices are high.

Cleanliness can only be achieved by education and by the example set to the pupils by their teachers; in a few of the schools the value of this example was evident.

Treatment for diseases encountered amongst the pupils is now carried out regularly and the results of the treatment of yaws and syphilis have been satisfactory; for ancylostomiasis less so owing to the fact that re-infection occurs automatically. Until preventive measures are taken to decrease the incidence of this disease, alleviation of the more marked symptoms is all that can be expected.

A. RURAL SCHOOLS ZANZIBAR.

TABLE I.

The total number of pupils 582, was distributed as follows :—

Name of School.		Africans.	Arabs.
Muyuni	...	37	2
Kombeni	...	61	3
Kizimkazi	...	68	2
Mwera	...	41	34
Makunduchi	...	82	—
Ndijani	...	53	3
Dole	...	28	50
Mkwajuni	...	12	4
Donge	...	12	7
Mangapwani	...	23	5
Uzini	...	26	1
Chwaka	...	27	1
		470	112

TABLE II.

Showing the percentage of the conditions found in racial groups.

		Africans.		Arabs.	
		1936	1937	1936	1937
		%	%	%	%
Nutrition					
Good	...	44.3	47.4	54.9	60.7
Fair	...	35.8	34.4	35.1	25.9
Poor	...	19.7	18.5	9.8	12.6
Cleanliness					
Good	...	36.2	39.1	73.6	70.5
Fair	...	45.1	42.5	14.2	23.2
Poor	...	18.4	18.2	12.8	6.2
Vaccination	...	45.5	85.5	73.6	83.1
Nose and throat	...	1.3	2.9	2.1	2.6
External eye	...	27.9	29.3	15.3	25.9
Ears	...	9.9	1.9	9.8	—
Teeth	...	37.8	35.3	50.5	44.4
Heart, etc.	...	1.9	1.6	4.3	2.6
Lungs	...	1.9	1.28	2.1	1.7
Enlarged spleen	...	39.3	39.4	48.3	48.2
Kahn test	...	12.1	7.2	7.6	7.1
Blood—Malaria parasites	...	39.3	34.4	40.5	31.2
Stools—Hookworm	...	72.5	43.6	53.6	38.1
Stools—Other helminths	...	64.4	39.4	25.7	10.7
Avitaminosis	...	—	36.8	—	14.3

Table III.

Comparative average heights and weights by Age-groups.

	6–8 years.		8 - 10 years.		10–12 years.		12–14 years.	
	ins.	lbs.	ins.	lbs.	ins.	lbs.	ins.	lbs.
1936.								
Africans ...	48.4	47.2	51.9	58.4	54.1	66.4	56.7	77.4
Arabs ...	45.7	45.8	48.7	53.5	52.3	65.2	57.3	83.4
1937.								
Africans ...	49.4	50.4	53.7	66.5	55.6	68.6	58.1	82.3
Arabs ...	46.4	49.1	51.2	56.5	53.6	62.7	58.1	81.5
DOLE SCHOOL.								
Africans ...	Nil		Nil		Nil		60.0	88.5
Arabs .	Nil		Nil		Nil		58.7	83.2

Table IV.

Showing average gain in height and weigth. Comparison between African and Arabs.

	8–9 years.		9–10 years.		10–11 years.		11–12 years.		ins.	lbs.
	ins.	lbs.	ins.	lbs.	ins.	lbs.	ins.	lbs.	12–13 years.	
Africans ...	2	4	2	5	2	3	3	5	2	11
Arabs ...	2	6	2	8	2	6	2	9	2	12

B. RURAL SCHOOLS PEMBA.

Table V.

Showing approximate percentage of conditions found all races.

Nutrition	
Good ...	41
Fair ...	45
Poor ...	14
Cleanliness	
Good ...	52
Fair ...	16
Poor ...	32
Vaccination ...	76
Teeth ...	44
Nose and throat ...	12
Eyes ...	0.3
Ears ...	8
Heart ...	5
Lungs ...	1
Spleen ...	57
Malarial parasites ...	52
Stools—Hookworm ...	64
Stools—Other helminths ...	—
Schistosomiasis ...	31

C. ZANZIBAR GIRLS SCHOOL.

TABLE VI.

Showing percentage of conditions found.

Nutrition	
Good ...	47.8
Fair ...	48.2
Poor ...	3.8
Cleanliness	
Good ...	74.3
Fair ...	19.1
Poor ...	6.5
Vaccination ...	85.4
Teeth ...	29.1
Nose and throat ...	19.7
Eyes ...	2.9
Ears ...	10.8
Heart ...	2.3
Lungs ...	2.3
Spleen ...	46.1
Blood parasites ...	39.4
Avitaminosis ...	1.4

D. ZANZIBAR GOVERNMENT CENTRAL SCHOOL.

TABLE VII.

Showing percentage of conditions found all races.

Nutrition	
Good ...	59.0
Fair ...	37.1
Poor ...	3.1
Cleanliness	
Good ...	87.0
Fair ...	6.3
Poor ...	6.7
Vaccination ...	95.7
Nose and throat ...	6.4
External eye ...	18.6
Ears ...	7.7
Teeth ...	28.6
Heart, etc. ...	2.7
Lungs ...	3.4
Enlarged spleen ...	22.5
Kahn ...	7.1
Blood—Malarial parasites ...	15.2
Stools—Hookworm ...	27.2
Stools—Other helminths ...	16.7
Avitaminosis ...	27.0

TABLE VIII.

Showing comparative height and weight of age-groups in Government Central School—different races.

	6–8 years		8–10 years		10–12 years		12–14 years	
	ins.	lbs.	ins.	lbs.	ins.	lbs.	ins.	lbs.
Arab ...	48	43	53	56	58	64	59	71
Comorian ...	50	54	53	59	59	78	60	83
African ...	52	62	53	65	58	80	61	88
Indian ...	47	42	55	65	55	72		

IV. HOUSING AND TOWN PLANNING.

A. URBAN HOUSING.

Zanzibar Town.

As in past reports it is convenient to consider Zanzibar Town as being divided into two distinct areas. The Western portion, composed mostly of rubble or stone built houses, and the Eastern made up of native type huts. The population is fairly evenly divided between the 3,000 houses of the Western or "stone town" and the 8,000 native huts, because the stone town houses as a rule are large and house many families whereas the native hut, in the town, seldom shelters more than five people.

(*a*) *The Stone Town.*—There was no town planning attempted during the year; in view of the exorbitant value placed on inferior houses and housing sites it is improbable that anything can be attempted until such time as the present population drift towards the periphery of the town has produced some effect on property values. There are indications that this is slowly happening.

Apart from improvements carried out in response to the demands of the Medical Officer of Health there was no sign of any awakening of property owners, or their tenants, to any general need for improving their housing or, indeed, keeping houses in repair. With few exceptions owners of buildings pursue a very short sighted policy in neglecting their properties till such time as they threaten to collapse or invite the attention of the Municipal Authorities. It is then the usual practice for the less prosperous owners, who form the majority to get heavily into debt to keep their houses in existence. This general incapacity is reflected inevitably in the housing condition of the inhabitants of the stone town. As in the past, overcrowding is the rule everywhere and no attempt is made to better conditions. In this respect the tenants are perhaps as much to blame as landlords in that they seldom appear to resent bad conditions and never make any concerted attempt to force landlords to improve their houses by insisting on getting value for the high rents paid. This is the more curious as this year, for the first time, there have been a number of houses left empty and even one or two tenements. This is explained, to some extent, by the tendency of Indian petty traders to forsake the stone town and establish themselves in the native area of N'gambo where rents are lower and opportunity for trading fairly good.

If funds were available it would be possible of course to built Government owned tenements or flats and move people into them from the more insanitary premises of the town and thus gradually to abolish the worst of the Zanzibar slums. There is, however, little hope that funds for this purpose will become available and, in the absence of Government building or subsidised efforts by building companies, all that can be done is to concentrate on the worst types of property in the town and gradually have them brought up to a reasonable standard. During the year 19 houses let in lodgings were surveyed and 11 applications for improvement were submitted subsequently to the building authority. These improvements followed the lines mentioned in earlier reports—that is to say blocks where numbers of internal rooms existed, which were deficient in light and ventilation, were opened up by means of creating internal courtyards. There is no doubt that the results, from the public health point of view are excellent, but landlords object to the expense and tenants—Indians—do not appear to mind dark and unlighted rooms if the rents are low.

Other buildings such as bakehouses (9), laundries (40), eating houses (52), dairies (9) were inspected and some improvements were made. In general it is difficult to get much done as the owners of these small enterprises are generally poverty-stricken and the strict application of the law would cause the bankruptcy of most of them. Each year, however, conditions are being improved and it is safe to say, at least, that few of these enterprises constitute such glaring examples of sanitary nuisances as they did three years ago.

A new departure during the year was the systematic survey of all Government owned and leased properties. 70 buildings were inspected and a very large number of unsatisfactory conditions came to light. The more urgent matters were dealt with by the issue of sanitary notices to tenants, and those of structural character are to be dealt with by the Public Works Department in 1938. It will be some years before all are brought into a really sanitary condition on account of the cost involved which is large, as might be expected, because no systematical attempts have been made previously to keep these properties in a satisfactory sanitary state. The annual survey is to be carried out every year in future.

Another unsatisfactory housing condition was observed this year. That is the housing of employees of various trades such as tailors, wood workers, etc. in a very inferior type of barracks, which is not registered as a house let in lodgings. Conditions were investigated in respect of most trades and action was taken to have adequate accommodation provided.

The practice of adding an additional storey to existing houses and putting up corrugated iron sheeting on tops of walls, to obtain greater privacy in courtyards, appeared to have increased during the year in some areas. An attempt was made to curtail these activities, but, in the absence of any building rules, the existing law does not allow of anything being done and conditions in places have become much more badly ventilated and congested than in the past. Building rules were formulated in 1935 but have not yet been promulgated.

(*b*) *The Native Town.*—Very little town planning was carried out during the year and what was done was of a very piecemeal character. The Towns Decree gives few powers to the town planners and the Town Planning Decree is not in force· Despite these difficulties some progress was made on the following lines.

(i) Where circumstances were suitable the attempt was continued to develop road lines. This was effected by dealing with individual applications to built or repair huts and it was often possible by agreement to have re-built or new huts lined up with their neighbours. An alternative was to acquire delapidated and insanitary huts and clear the sites—this procedure was not adopted very often as very little money was available for acquisition. Nevertheless quite a number of roads have been evolved gradually in the native area and very little discontent or hardship has resulted. At some future date—when a town plan is declared it may be possible to have these sandy tracks converted into roads and sewered. In fact, in 1938, a start will be made by metalling a half mile stretch—mainly as a means of preventing soil erosion.

(ii) Better type buildings are slowly being erected to replace older type huts. The standard Health Office plan is popular and is generally used and is preferred by native builders as they are able now to give estimates of cost based on the quantities of material to be used.

(iii) Two Government owned areas in the town—Saateni and Holmwood—were surveyed and laid out as model villages but few people could be pursuaded to live there on account of the lack of water. This difficulty will be met in 1938 by an extension of the pipe line and the two areas may become popular.

(iv) The removal of some 1,500 cattle from the Government dairy at Mji Mpia left about 7 acres available for development as a building area. Plans were prepared and the area laid out in plots which will be allocated to persons removed from congested areas. The proposal was approved that Mji Mpia should be made a model village with made up roads, sewers, light, etc. and provided with its own market and child welfare clinic, but again nothing could be done on account of expense and, apart from setting out huts in an orderly fashion, Mji Mpia will differ in no way from its surroundings.

It is apparent that town planning could be carried out in the native areas and recommendations have been made that the long delayed town plan should be prepared and a general plan decided upon. After that, a detailed plan should be declared for individual areas—dependent on the funds available—and gradually the whole of the N'gambo could be dealt with. The longer town planning of N'gambo is put off the more expensive it is likely to become, on account of the drift to the native areas from the stone town and the gradual erection of rubble buildings amongst the huts.

Steady pressure was kept up for the provision of better lighted and ventilated houses and the building of a sanitary type of latrine and cesspit. When the owner could afford it these improvements were very often carried out—the stumbling block is that the majority of the Ngambo houses are owned by old people who depend on lodgers for a living and have no money to repair or improve their properties. This trouble seems to have become worse rather than better as the number of itinerant labourers in Zanzibar town is on the decrease and it is not so easy as in the past to obtain lodgers. In addition a number of huts are owned by landlords who have taken possession of huts whose owners have defaulted over their ground rent. This type of property is looked upon as one from which the maximum revenue is to be obtained and no money spent on improvements and the results are bad. This touches another vital point in regard to Zanzibar housing—that few hut owners do more than lease their plots by the month and consequently are willing only to carry out the minimum of improvements and repairs as they feel that they are always liable to eviction. The solution of this problem would appear to be the acquisition by Government of tracts of land where long leases could be given and encouragement given to people willing to erect substantial buildings of a good type.

During the year the Joint Building Authority—the executives on which are the Medical Officer of Health and an officer of the Public Works Department—dealt with the following applications :—

To erect new huts ...	237
To rebuild old huts ...	347
To repair huts ...	967
To build houses ...	9
To repair houses ...	332
To alter or improve houses ...	122

(*c*) *Pemba Townships.—Housing.*—The conditions of housing are similar in all three townships in that few or no proper side streets exist, and considerable difficulty has been experienced in regard to house alignment as no approved town planning schemes exist, except in the case of Mkoani. Thus the inevitable result is difficulty in control of cleanliness and in making routine inspections. Crowding and congestion are rife everywhere.

Sanitary nuisances are more common in the Pemba townships and there are no plans of the townships for improvements. In Chake Chake in particular the lack of streets, air and ventilation is worse than in Zanzibar.

When the proposed new extension of the Kitutia district in Wete commences, it is intended to lay down definite town planning schemes in order to improve matters for the future.

The total number of building applications dealt with during 1937 was 577 as follows :—

	Wete.	Chake Chake.	Mkoani.	Total.
To erect new huts ...	12	27	27	66
To erect new garages ...	5	—	—	5
To erect temporary buildings ...	4	27	10	41
To erect new houses ...	6	—	—	6
To rebuild old huts ...	9	—	—	9
To repair huts ...	127	209	11	347
To repair houses ...	5	—	—	5
To alter or improve houses ...	8	3	—	11
Additions or alterations to huts ...	24	54	9	87
	200	320	57	577

B. RURAL HOUSING.

A comprehensive survey of rural housing conditions has been given in this report for some years past and conditions did not alter during 1937. The position may be summarized by saying that rural housing is not good but on the whole there is little overcrowding. There is some hope that it may be possible to improve matters in the future as, towards the end of the year, it was possible for the first time to post qualified African sanitary inspectors in three rural districts. As explained earlier in this report these men will be concerned primarily with latrine construction but it will be part of their duties to advise on housing construction. As it becomes possible to post more rural sanitary inspectors it is hoped they will gradually influence rural housing for the better.

V. FOOD IN RELATION TO HEALTH AND DISEASES.

Considerable interest has been shown in the subject of the food problems of the native population as the result of the publication of a "Nutritional Review of the Natives of Zanzibar", prepared by a committee consisting of the Provincial Commissioner, the Director of Medical Services, the Director of Agriculture, the Director of Education and the Curator of the Museum, in response to a request from the Secretary of State for the Colonies. The review was published as Sessional Paper No. 2 of 1937, and subsequently correspondence which passed between the Secretary of State and the Acting British Resident on the subject was also published as Sessional Paper No. 10 of 1937.

The recommendations made in this report were under consideration during the year, but of necessity their implementation must be a matter of time and governed largely by financial considerations. It was found possible however to endeavour to cheapen the price of food by the removal in July of the ten per cent cess which had been levied by Government on all produce which passed through the town market. By Decree all meat, poultry, fish, fruit and vegetables could only be sold in a public market, and at the time the cess was withdrawn an amending Decree was passed to free fish from this term of the principal Decree. This has resulted in free peddling of fish in certain rural areas where it was rarely available before. The anticipated drop in the price of food-stuffs has not, however, been realized.

An enterprise referred to at some length in Sessional Paper 10 of 1937, was that undertaken by the Clove Growers Association of providing their labour with additional articles of preventive food-stuffs to make up the deficiencies of the usual native diets and with a meal which it was calculated would, with the food they provide for themselves, allow sufficient energy value for the performance of continual hard work. The experiment failed to provide conclusive results owing to a number of circumstances, some of which are inherent in the experiment itself, and others due to unexpected events in the commercial and political state of the country. Of the latter no more need be said in this report, but some explanation of the former appears desirable as it is hoped to continue the experiment when circumstances permit.

The chief difficulty in the prosecution of the experiment was the instability of the labour employed. This constant changing of the personnel was due partly to sickness and partly to the natural disinclination to work which periodically attacks all natives when even an extra meal a day fails to produce regular attendance.

The primary aim of the experiment is to provide a body of labour which by expenditure upon it in excess of that obtaining in the labour market generally, is capable of an output of work which renders it economically superior to the cheaper labour which at present exists.

The second aim, in common with the secondary aims of high grade feeding in Government boarding schools and prisons, and of the provision of subsidiary meals to rural day school children, is to create amongst an increasing number of the population a dissatisfaction with their existing dietary, which may in time develop into an unconscious recognition of the merits of an amplified diet amongst the population generally.

The first result of the success of such an experiment would be the raising generally of the cost of labour. This would no doubt be welcomed by those employers of labour who demand a high output of work regularly undertaken and who would benefit by the employement of labourers capable of providing this. But there are many businesses, perhaps most in Zanzibar which have been built up upon the capacity of the native labourer as he exists to-day, and only demand intermittent work with a low output and there is no doubt that employers of this type would suffer from a general rise in the cost of labour. In the end, of course, all would benefit, but after a delay of probably very many years.

If by this means it were found possible generally to raise the standard of living of the labourer, the tendency in the course of time would be towards the application of this higher standard to the families of the labourers. This contingency is so remote that its implications need not be considered. Nevertheless, the intent of this experiment is based on a belief that its general application might in the course of time contribute towards the raising of the standard of living of the population generally by creating amongst a few a liking and appreciation of food-stuffs which at present are considered to be beyond the purchasing power of the native.

The question of providing subsidiary meals for school children was under consideration and it was decided to provide a sum in next years estimates to allow a trial to be made at a few of the worst schools.

WHOLESOMENESS OF FOOD.

The following table gives the amounts of the various foods condemned during 1937 as unfit for human consumption in Zanzibar Town.

	lbs.
Vegetables ...	53,470
Fruit ...	27,900
Potatoes ...	22,400
Dates ...	115
Fish—wet ...	408
Fish—dry ...	1,355
Beef exposed for sale ...	75
Mutton ...	4
Boiled ham 2 tins ...	13
Salted pigs feet and pickled cabbage 5 tins ...	10
Sauerkraut 1 tin ...	2
Crustless cheese ...	35
Cheddar cheese ...	288
Chocolates and toffee ...	45 140

The following figures of food condemnation are given in the year 1937 by the Veterinary Officer under the Department of Agriculture:—

ZANZIBAR.

	Oxen.	Cows.	Calves.	Goats.	Sheep.
Carcasses wholly condemned at Slaughter house ...	9	1	—	5	1
Carcasses partially condemned at Slaughter house	813	—	—	1,820	707

B. MEASURES TAKEN TO SPREAD THE KNOWLEDGE OF HYGIENE AND SANITATION.

In Schools.—It was possible this year to make a start in having lectures on Health subjects given in schools by rural Sanitary Inspectors. This system only started towards the end of the year, but the children in the schools concerned appeared interested in simple lectures on hookworm, malaria, scabies and round worms, which were the subjects to which lectures were confined at first.

In addition copies of pamphlets printed for distribution during the two health exhibitions were sent to each school and the masters devoted some time to explaining their meaning.

By Propaganda.—The same district Sanitary Inspectors for the last two months of the year, as a routine, visited markets, mosques and other places where people congregate in order to lecture on hookworm. When time permitted they mentioned also malaria and venereal diseases—but as a start they concentrated on hookworm. The reaction of the people was very slight. They are reported to be very largely indifferent as to whether they have hookworm or not and regard the disease as a normal concomitant of life. At the same time they expressed no active opposition to Government's proposals for providing each house with a latrine and seeing that it is used. Indeed the consensus of opinion appeared to favour the scheme with a frequently expressed reservation that there must be a "catch" somewhere as it seemed unlike Government to spend money in this way unless some more than adequate return was in clear view. In the area where this propaganda was carried out a great deal was done at evening gatherings in villages to explain matters and with the dissemination of thousands of pamphlets in Swahili and Arabic it is hoped that people will gradually take in the meaning of anti-hookworm work.

By Exhibitions.—As in 1936 Health Exhibitions were held in Zanzibar and Pemba during the year. Lack of funds somewhat curtailed both as only £25 was available for all purposes—including transport—and indeed the exhibitions were made possible only by the public spiritedness of numbers of Indian gentlemen who loaned the equipment and all the types of articles required.

In general the exhibition held at Zanzibar and that at Chake Chake in Pemba followed the same lines as the 1936 exhibits of which details were given in last year's report. Nothing new was attempted. Neither exhibition attracted as much attention as the first two in 1936 and the smallness of the show may be responsible for this.—People were interested but apathetic, and few enquirers showed an intelligent appreciation of what was displayed.

The impression was gained, both in 1936 and this year, that the showing of a large number of exhibits to a big crowd is probably a waste of effort as the mentality of those whom it is hoped to interest is not sufficiently elastic to appreciate what is shown. The better policy would appear to be to concentrate all efforts on a few subjects and keep these before the public eye. This year hookworm is being dealt with in this way and probably will be the chief aspect of public health stressed for a couple of years.

During the early part of 1937, short lectures were given by medical officers in Pemba, illustrated by pictures and drawings, to assemblies of mudirs and shehas, which were attended in some cases by other members of the communities. These lectures were devoted to the causes and treatment of the more common communicable diseases in the island and the methods of preventing them. These pictures were then given to the district dispensers to take around their areas to demonstrate to the people in the villages.

Each dispenser has been required to spend his afternoons doing health inspections of the villages neighbouring his dispensary and to keep a record showing the villages visited, the number of houses with latrines, number and condition of wells, coffee shops and general cleanliness of the village. It is doubtful if the dispenser's advice is often taken, but his visiting book will be very useful to the Medical staff if contemplating rural health investigation or hookworm surveys.

C. TRAINING OF SANITARY PERSONNEL.

Sanitary Inspectors.—As outlined in the 1936 report systematic training of sanitary inspectors was carried out in 1937 and culminated in an examinaton held in September under the auspices of the Royal Sanitary Institute. Nine candidates presented themselves—all from Zanzibar—and five satisfied the examiners.

This training scheme was of peculiar interest as it was the first of its kind to be undertaken in East Africa and students were drawn from Indian, Goan and African commuities.

The syllabus approved some years ago for Sanitary Inspectors' training in Tanganyika Territory was followed, but it was decided during the year to form a Joint East African Examining Board for Sanitary Inspectors in East Africa and to issue a new syllabus. The Royal Sanitary Institute has suggested that retrospective recognition under the new Joint Board shall be given to the Zanzibar Sanitary Inspectors who passed in September and it is hoped this will be done. Failing this Royal Sanitary Institute will issue certificates under the Tanganyika Territory regulations.

The students were trained in the same way—as far as possible—as a European class and the examination was up to European standards. The papers were set by examiners appointed from Tanganyika Territory and Zanzibar and a board of five conducted the examination; it was composed of the Acting Deputy Director of Medical Services, Tanganyika, the Medical Officer of Health, Zanzibar, a Sanitary Superintendent of Tanganyika, a Public

Works Department Water and Drainage Engineer, and an Assistant Medical Officer of Health. The answers to written and oral questions were of a surprisingly high standard and were commented on favourably by the Examination Board of the Royal Sanitary Institute.

Two points arose as a result of the examination (1) that an undue proportion of marks was allocated to written and theoretical work and too little for practical work and (2) the purely African public health matters were not sufficiently stressed in the syllabus, which paid a good deal of attention to conditions with which Inspectors working in East Africa would not be called upon to deal. These points were brought to the notice of the Royal Sanitary Institute and the new syllabus for the Joint East African Examining Board has been planned to obviate these objections.

The industry displayed—particularly by the African students—was astonishing and apart from practical work it was remarkable the grasp the students displayed of rather abstract subjects such as the modern knowledge of vitamins, water purifications and particularly the life history of various tropical parasites.

The success of this venture has caused Government to increase the sanitary inspector staff of the Protectorate so that it will be possible in 1938 to continue training a new class with the object of eventually posting a Sanitary Inspector to every rural district. There is no doubt that this will be of immense value in the future amongst such individualistic people as those of Zanzibar where, in the absence of any tribal organization, it is necessary always to deal with individuals.

Rural Dispensers.—Training was carried out during the year to fill vacancies on the staff. As far as possible the elements of public health were taught so that these dispensers will be able to act as assistants to rural sanitary inspectors.

General.—As before miscellaneous employees such as Health Office porters, sweepers, mosquito searchers and so forth were encouraged to attend night school. Those who have persisted for a year or two have all achieved promotion and the most promising of the younger ones have gone to the hospital for extended training. It has become, in fact, the routine to fill all the better paid appointments by men who have been employed in junior posts but who have had the initiative to help themselves.

SECTION IV.

PORT HEALTH WORK AND ADMINISTRATION.

During the year 589 ships and 712 dhows visited the harbour as compared with 563 ships and 582 dhows in 1936. 1,531 immigrants landed and 14,830 emigrants embarked.

Under the system in force during the past two years automatic pratique was granted to all ships before arrival and a Sanitary Inspector visited each ship only for the purpose of vaccinating passengers who proposed to land. A total of 2,344 vaccinations were carried out in ships.

Dhows were visited by the Port Sanitary Inspectors on arrival and all unvaccinated persons were dealt with—only 455 showed no signs of vaccination this year.

The Port Sanitary Inspector also vaccinated 1,940 persons leaving the Protectorate by ship.

In general there is nothing to report as regards Port Health—no cases of infectious diseases required to be dealt with in ships or dhows and most of the ship masters have got used to ''automatic free pratique'' and comply with the necessary formalities so the system has worked to the mutual advantage of all concerned; and a great deal of time is saved to shipping firms by allowing ''clean'' ships to work cargo on arrival at any time of night.

Some few difficulties were met with over the importation of rather undesirable second-hand clothes during the year—as, frequently, certificates issued with the consignments were not satisfactory.

347 aeroplanes arrived and left. As all come from Kenya or Tanganyika Territory no quarantine restrictions of any sort are imposed and, so far, do not appear to be called for. These aeroplanes carried 384 immigrants and 267 emigrants.

Quarantine Island.—This was maintained as usual during the year but a survey in December revealed the fact that extensive repairs are required to all buildings and the work is to be put in hand in 1938.

SECTION V.

WOMEN'S CLINICS AND MATERNITY AND CHILD WELFARE.

The Zanzibar Maternity Association, which is an organization subsidized by Government, is no longer under the control of the Medical Department, but is managed by its own committee. Returns will not in future be included in this report.

In Zanzibar the Women's Out-patient Department was separated from that of the men in 1936, after the arrival of Woman Medical Officer, and forms a separate unit under her control staffed entirely by women. This is the first completed year of this arrangement and a summary of the Woman Medical Officer's report is given below.

Report on Women Out-patient Department January to December, 1937.

The attendances of women and children (including boys up to 5 years) during the year showed a very great increase on that of the previous years.

	July to December 1936.	1937.
Number of new cases ...	2,799	7,310
Total attendances ...	10,172	43,306

General Clinics—The majority of cases treated at the general clinics show an incidence of disease in much the same proportion as that of the men, in order of frequency:

Malaria
Ancylostomiasis
Dental caries
Venereal diseases
Gynæcological conditions
Influenza (Epidemic from February to April)
Rheumatism
Coryza
Bronchitis

Otitis Media and Dermatitis are extremely common among the children and are in the majority of cases accompanied by a positive malarial blood film.

Special Clinics.

Infant Welfare.—Total attendance 3,612. Three clinics are held weekly one for Swahili and Indian babies, one for babies of the teachers of the Government Girls School, and one for babies of subordinate officials.

The babies are weighed, and weekly records kept. Regular instruction in methods of feeding and suitable food and simple rules of cleanliness and hygiene, are given to the mothers.

The majority of babies attending require medical treatment as well, but a small nucleus of healthy babies is growing steadily, the sources being the maternity department in the hospital, and the Government Girls' School.

The clinic are steadily increasing and results are encouraging, as many mothers are showing great interest and appreciation of the instruction given.

Ante-Natal Clinic.—Total attendances 847. The clinic is held weekly, and is slowly and steadily increasing.

The aim is to provide for ante-natal supervision throughout pregnancy, and for skilled hospital treatment in complicated cases.

Co-operation with Mwembeladu Maternity Hospital of the Zanzibar Maternity Association and local midwives working in the district, is aimed at.

GENITO URINARY AND VENERAL DISEASES CLINICS.

Total attendances	...	1,449
Injections given	...	3,845

The Genito-co-Urinary Clinic for gynæislogical treatment is held weekly. Cases treated are mostly cervicitis, with encouraging results.

The majority of attendance in the first six months were Indians; the last six months the proportion is about equal between Indians and Swahilis.

Injections (Specific and Anti-gonococcal) are given bi-weekly.

Hookworm Clinic.—Total attendances 1,572. The weekly clinic has increased very rapidly and appears popular. Results are encouraging the majority of cases being free from the parasite after six treatments.

Diabetic Clinic.—Attendances are unsatisfactory and erratic, and out-patient treatment seems most inefficient—probably owing to the diet difficulty in the patients' homes.

An average of five or six attend weekly for blood sugar tests.

Sterility, Fertility and Infant Mortality.—Over a period of 1 year, a series of women were interrogated in detail as to their pregnancies, and the following figures obtained, for Zanzibar City, in Swahilis and Indians, and at the shamba dispensaries Selem and Mkokotoni, in Swahilis only.

		Zanzibar.			Selem.	Mkokotoni.
		Swhahilis.		Indians.		
		A	B			
Total number	...	100	100	100	136	114
Pregnancies	...	293	171	564	304	425
Living	...	115	82	294	152	212
Still births	...	21	21	29	17	27
Died under 4 weeks	...	21	7	2	14	6
Died under 1 year	...	37	9	62	27	55
Died over 2 years	...	32	17	41	29	80
Miscarriages	...	66	26	146	65	45
Sterility	...	not done	25	not done	36	14

Rural Dispensaries.—Four weekly clinics have been in existence during the year.

(*i*) *Ziwani Police Lines.*—New cases 24. Total attendances 35. Clinic started in December, 1936, and closed in March, 1937. Attendances were encouraging for the first two weeks, and afterwards were so poor that it was not worthwhile to continue the clinic.

(*ii*) *Selem Dispensary.*—New cases 427. Total attendances 1,510. Of these cases, the following diseases were in greatest evidence:

Ancylostomiasis	...	142
Malaria	...	58
Syphilis and Gonorrhœa	...	52

The clinic is popular and attendances pretty regular.

(*iii*) *Mkokotoni Dispensary.*—New cases 402. Total attendances 928. Diseases in greatest evidence were:

Ancylostomiasis	...	69
Syphilis and Gonorrhœa	...	54
Malaria	...	28
Yaws	...	135

About one-third of the patients come regularly from Tumbatu Island and are almost without exception cases of Yaws in all stages.

(*iv*) *Mwera Dispensary.*—The clinic opened in September, 1937 and has grown extremely slowly, but is now firmly established.

SECTION VI.

HOSPITALS AND DISPENSARIES.

In the following tables A and B details of the work carried out at the various Government hospitals and dispensaries are tabulated.

TABLE A.

Medical Units, Beds and Patients by Districts.

	Zanzibar Island.		Pemba Island.		
	Town.	District.	Town.	District.	Total
MEDICAL UNITS.					
European Hospital ...	1	—	—	—	1
Asiatic and African Hospital ...	1	—	3	—	4
Police Lines ...	1	—	—	—	1
Prison Infirmary ...	1	—	—	—	1
Infectious Disease Hospital ...	1	—	—	—	1
Walezo Poor House ...	—	1	—	—	1
Makondeni leper colony ...	—	—	—	1	1
Sub-Dispensaries ...	2	13 19	—	7	22
Mental Hospital ...	1	—	—	—	1
Eye Clinic ...	1	—	—	—	1
School Clinic ...	1	—	—	—	1
Walezo leper colony ...	—	1	—	—	1
IN-PATIENTS.					
Beds available:					
European ...	14	—	—	—	14
Asiatic and African in Hospital ...	(1)95	—	101	—	196
African in Institutions ...	(2)81	(2)192	—	—	(2)273
Total ...	(2)190	(2)192	101	—	483
Cases admitted:					
European ...	77	—	—	—	77
Asiatic and African in Hospital ...	2,215	676	1,491	—	4,382
Africans in Sub-Dispensaries ...	—	129	—	—	129
Total ...	2,292	805	1,491	—	4,588
OUT-PATIENT ATTENDANCES.					
Hospitals ...	106,012	43,235	79,736	—	228,983
Sub-Dispensaries ...	42,573	123,644	—	53,179	219,396
Total ...	148,585	166,879	79,736	53,179	448,379
NEW CASES.					
European ...	333	—	—	—	333
Asiatic and African in Hospital ...	23,245	11,272	27,885	—	62,402
Africans in Sub-Dispensaries ...	12,865	35,324	—	14,618	62,807
	36,443	46,596	27,885	14,618	125,542

(1) Twenty extra temporary beds are in use on the verandah of the Zanzibar Native Hospital.

(2) This includes the Mental Hospital, Poor House, Leper Colony and Isolation Camp—none of the beds are therefore "hospital" beds in the strict sense of the word and their occupants are not really "in-patients".

TABLE B.

List of Sub-Dispensaries.

ZANZIBAR DISTRICT.

Name.	New Cases.	Attendances.
School Clinic	2,480	3,012
Mkokotoni	3,795	13,439
Selem	4,038	9,720
Makunduchi	3,141	8,806
Dole	498	445
Mwera	3,419	5,777
Chaani	1,975	4,193
Uzini	1,772	3,620
Kizimbani	1,708	3,217
Bububu	1,591	4,578
Bweleo	2,195	4,662
Kizimkazi	2,072	3,515
Mangapwani	1,732	3,783
Chwaka	3,405	6,098
Tunguu	1,938	2,606
Mbiji	2,585	11,264
Travelling	6,485	7,938
Mwembeladu	7,222	27,273
Ndijani	302	112

PEMBA DISTRICT

Name.	New Cases.	Attendances.
Mzambaraoni	1,690	5,329
Matangatwani	2,165	8,405
Kinazini	2,055	8,200
Stambuli	1,331	2,482
Ole	1,922	6,670
Kengeja	4,110	7,420
Kangani	1,897	4,053

SECTION VII.

REPORT ON THE GENERAL HEALTH OF THE PRISONERS AND SANITATION IN ZANZIBAR PRISONS.

The details relating to each prison were as follows :—

	Daily average in Prison.	Daily average on sick list.	Deaths.	Morbidity rate.	Death rate.
Central Prison ...	125.5	7.0	Nil	55	Nil
Wete, Pemba ...	16.3	2.1	2	—	75
Chake Chake, Pemba ...	10.4	1.2			

Health of the Prisoners.

I. Zanzibar Central Prison.

In the Central Prison the health of the prisoners was exceedingly satisfactory. The morbidity rate of 55 in 1937 is even lower than the figure for 1936 which stood at 63. No deaths occurred and no epidemic diseases. Diseases encountered include syphilis (67 cases) intestinal parasites (182 cases) malaria (20 cases) and gonorrhœa (9 cases). The daily sick parade usually consisted mainly of coughs and colds, minor abrasions and constipation.

As in 1936 all new admissions were examined for evidence of syphilis, intestinal parasites and gonorrhœa. Bloods, stools and blood smears were sent to the laboratory as a routine.

The following table shows the laboratory findings on the specimens submitted :—

	Positive.	Negative.	Doubtful.
Kahn Test ...	34	133	37
Blood for Malaria Parasites ...	16	56	—
Stools for dysentery ...	—	1	—
Smears for gonoccoccus ...	9	10	—
Urine for Bilharzia ...	57	179	—
Sputum for tubercle bacillus ...	1	2	—
Stools for intestinal parasites ...	182	102	—
Skin Clip for M. Lepræ ...	—	1	—
Smear for M. Lepræ ...	—	1	—

The fact that some of these positive findings do not coincide with the chief diseases treated is due to the fact that some patients under treatment in 1936 carried on their treatment in 1937.

II. Pemba Prisons.

The health of the prisoners in Pemba was satisfactory the causes of attendance at the hospital being mainly minor injuries, bronchitis and malaria. The two deaths that occurred were due to post operative shock and cerebral hæmorrhage respectively.

Prison Diet and Avitaminosis.—An examination of the prisoners in the Central Prison Zanzibar for signs and symptoms of avitaminosis revealed a striking testimony to the efficacy of a well balanced diet.

The new comers nearly all bore stigmata of marked vitamin deficiency such as aphthous patches at the corners of the mouth and Bilots spots on the conjunctivæ. Prisoners who had been in custody for a couple of months showed these lesions either healing or healed. Those prisoners who had been in prison for a long time (1 year and upwards) failed to show any signs of vitamin deficiency. No case characterized by neuritic pains in the legs was seen.

Sanitation.—No failure of the water supply occurred in 1937.

Due to efficient scavenging and burying of refuse no nuisance was caused by flies. The fact that no case of dysentery occurred in 1937 is probably due to this satisfactory state of affairs.

B. MENTAL HOSPITAL.

Details of admissions, discharges and deaths during 1936 were as follows :—

	Males.	Females.	Total.
Number of inmates 31st December, 1936 ...	28	16	44
Admitted during 1937 ...	10	3	13
Died during 1937 ...	4	1	5
Discharged during 1937 ...	4	2	6
Remaining on 31st December, 1937 ...	30	16	46

Three of the five deaths were due to general debility and old age and the remaining two were due to cerebral hæmorrhage.

The types of insanity prevailing at the end of the year were :—

	Males.	Females.	Total.
Mania ...	11	4	15
Melancholia ...	11	8	19
Senile dementia ...	5	3	8
Dementia præcox ...	1	1	2
Paranoia ...	1	—	1
General paralysis of the insane ...	1	—	1

As stated in last years report and in previous years, the above diagnoses cannot be regarded as strictly accurate. No reliance can be placed upon the history given by a patient's relatives and further difficulty is added by the fact that it is often necesssary to question the patient through the medium of an interpreter. Indeed, one patient speaking an obscure language, had to be interrogated by another patient—a fellow country man of his—who then passed on the information to the examining Medical Officer.

The Health of the Patients.—As in 1936—the bloods and stools of new admissions were examined as a routine.

Ova of hookworm were present in 50% of the stools as against 80% of the thirteen new admissions; it was only possible to obtain blood for a Kahn test from seven—the others violently resisted any attempt at taking their blood. Two out of the seven which were obtained were positive.

Treatment was administered to those with ova of hookworm in their stools and to those whose blood gave a positive Kahn reaction.

The general health of the patients was excellent and there is little doubt that this satisfactory state is due to the ample diet which the inmates receive. This diet was first introduced in 1935. In many cases the mental state of the inmates improves rapidly after admission and as no psychological treatment is carried out this improvement is doubtless due to the good feeding the patients receive. On admission patients are often seen to be suffering from semi-starvation.

Sanitation.—No irregularity occurred in the water supply during 1937.

The asylum premises were always clean and well kept.

Accommodation.—Due to the transfer of an extra block of the Prison to the Mental Hospital in 1936 the accommodation was fairly satisfactory in 1937. Three of the discharges were patients whose relatives undertook to take care of them. Unfortunately a number of the inmates who might be released in this manner have no traceable relatives.

Occupation.—A part from the female patients who help in preparing the food for themselves and for the other patients no work is done by the inmates. Nevertheless they do not appear to find time hanging heavily on their hands and the majority are obviously contented.

C. WALEZO INFIRMARY FOR THE POOR.

The figures for 1937 regarding the inmates of the infirmary were:—

	Males.	Females.	Total.
Remaining on 31st December, 1936 ...	79	32	111
Admitted during 1937 ...	358	70	428
Discharged during 1937 ...	273	27	300
Died during 1937 ...	93	46	139
Remaining on 31st December, 1937 ...	71	29	100

The Walezo institutions remained under the care of a Sister of the Roman Catholic Mission and an assistant. During 1937 a building was constructed of semi-permanent materials for the purpose of housing cases of paralysis who otherwise would occupy beds in the main wards for many months. This building which is well ventilated, can accommodate six patients, thus leaving an equal number of beds in the main wards free to patients who are likely to be in hospital for a shorter period.

D. WALEZO TUBERCULOSIS ASYLUM.

The year's figures for this institution were:—

	Males.	Females.	Total.
Remaining on 31st December, 1936 ...	25	1	26
Admitted during 1937 ...	66	2	68
Discharged during 1937 ...	38	1	39
Died during 1937 ...	31	2	33
Remaining on 31st December, 1937 ...	22	—	22

Unfortunately none of the thirty-nine cases shown above as having been discharged were sent away cured. This figure represents those individuals who either grew tired of living in the institution or milder cases who having felt the benefit of a few weeks rest coupled with good food, decided that they were cured and went away.

Tuberculosis in Zanzibar runs a very acute and febrile course. The native will not present himself for advice at hospital or dispensary until he is in the last stages of the disease. Occasionally an early case is met with in the course of examination for some other complaint, but it is impossible to make the native realize that to achieve anything approaching a cure—months and perhaps years of absolute rest are required.

E. WALEZO LEPER SETTLEMENT.

The details for the year were:—

	Males.	Females.	Total.
Remaining on 31st December, 1936 ...	32	20	52
Admitted during 1937 ...	7	11	18
Discharged during 1937 ...	2	4	6
Died during 1937 ...	3	6	9
Remaining on 31st December, 1937 ...	34	21	55

Having been in existence for nearly two years this colony is now well established.

In 1937 each hut was equipped with a pit latrine provided with a cement cover. Those of the inmates who were able to do so, built shelters around their own latrines, while shelters were provided for those who were incapacitated from building through illness. During the year bananas were planted in all the swamps adjacent to the colony with the result that these swamps no longer afford breeding places for mosquitoes. In the earlier part of the year a considerable amount of soil erosion took place in the colony but this has been checked succesfully by increased cultivation and by setting transverse ridges planted with grass against the slope of the ground.

No case of leprosy was discharged as cured but three "burnt out" cases were allowed to go and live in their own houses outside the colony. Three others (natives of Pemba) were transferred to Pemba Leper Colony at their own request.

All of the 18 admissions presented themselves voluntarily, which fact testifies to the popularity of the institution. Beyond injections of Alepol in a few cases, no routine anti-leprosy treatment was given to the inmates. However, anti-syphilitic and anti-helminthic treatment is given as a routine to those in need of it.

The hospital, which consists of two two-roomed wards was in constant use in 1937. It has proved to be of great practical value in treating those cases who are so disabled by their lesions that they are unable to attend the out-patient department for daily dressings.

F. MAKONDENI LEPER SETTLEMENT, PEMBA.

Makondeni, the Pemba Leper Settlement, is 4½ miles north of Wete, and easily approached by car. It is a village consisting of 48 huts, a mosque, a small shop, market, hospital and dressing rooms.

The lepers live one or two to each hut and employ themselves, some in cultivation of crops, and some in keeping poultry, while others receive a small monthly allowance for carrying out hospital orderly duties, sanitation labour, etc. All receive certain foodstuffs and fish money from the Government, and also there are grape fruit and lime trees within the boundaries.

Every hut is equipped with a pit latrine, and the settlement refuse is disposed of by incineration. The water supply is from a well and also from tanks filled by catchment from the hospital and dressing room roofs. It is hoped to improve the well in 1938 by raising a coping around.

The hospital consists of two wards containing six beds in all, but no admission took place during the year as the lepers appear to prefer remaining in their own houses.

The settlement has during the year been visited at least once a week by the District Medical Officer and twice or thrice weekly by a Nursing Sister from Wete, and these visits have been made at definite regular times.

Of the sixty-three lepers remaining at the end of 1937 the District Medical Officer sees ten each week in addition to any cases requiring urgent treatment. Thus every leper is seen approximately each six weeks. A separate file for case records with complete details of history and examination, and containing treatment sheets, has been made out for each patients. Microscopical investigation has been carried out on the blood, stools, and urine of every case. During the year 10 cases requested admission and were taken in. Despite the fact that no treatment with chaulmoogra derivatives was given during most of the year, three cases have become bacteriological negative, clinically arrested, and fit for discharge. Of these one preferred to remain, and the other two were discharged. However, of the latter, one returned 10 days after leaving the institution and requested re-admission not because she was ill, but because she said she was happier at Makondeni.

Treatment has largely been confined to:

(1) That of coincident diseases, helminthic, malaria, etc.
(2) Treatment of ulcers.
(3) Symptomatic treatment of leprosy, e.g. of the eye and nose conditions, and neuralgic pains.

During the routine examination of the patients the following figures came to light:—

In over 14% there was a history of leprosy in one or more members of the same family. Out of 63 lepers, 29 were in a reasonably early stage; in four the disease was very florid. Of the remaining twenty-nine, eight were obviously in an infective stage though improving; fourteen were almost arrested clinically; and seven would have been fit for discharge but for the crippling end-results of the arrested disease.

The following table shows the number of coincident diseases met with and treated where possible :—

Malaria	30
Hookworm	25
Other intestinal worms	3
Gonorrhoea	3
Syphilis	2
Congenital syphilis	1
Tinea	2
Scabies	8
Corneal ulcers	1
Cataract	2
Enlarged liver and spleen	1
Elephantiasis (filarial)	1
Chronic Mastitis	1
Avitaminosis	1

Three cases were blind from complete destruction of the globe.

The high incidence of malaria (parasite index being nearly 50%) suggests extensive anopheline breeding grounds close by, and it is proposed to investigate this matter in the near future.

A large number of cases suffer from ulcers, either trophic or on nodular areas. A few have ulcers, kept up by the presence of sequestra. It is proposed early in 1938 to deal operatively with these, and to test out the efficiency of strapping on ulcers without sequestra.

SECTION VIII.

METEOROLOGY.

All available information is printed in the Blue Book for the Protectorate.

SECTION IX.

ANNUAL REPORT OF THE DENTAL SURGEON.

After four years of observation of the natives of Zanzibar Protectorate it is safe to affirm that over 90 per cent of them suffer from dental disease. Most of this disease is naturally dental caries, but gingivitis in its many forms is far from uncommon. Most of it arises from salivary calculus which the native appears to make no attempt to remove.

On my arrival here, I found that the native had to be coaxed to have work done unless he was in great pain, and that so long as a tooth was not causing pain no argument was strong enough to convince the patient of the necessity of extracting it. A daily dental out-patient hour was inaugurated at Zanzibar Hospital and in time became accepted by the native himself as part of the hospital routine. It is now very popular and this year over 2,500 cases were seen; a marked increase over previous years.

It is gratifying to record that the rural native is also showing some signs of appreciation of facilities for dental treatment, and villagers have asked for my services in their villages. During the year four visits were paid to different villages with most encouraging results, so much so that I hope next year with the co-operation of the District Commissioner and of the mudirs to make this a regular feature of the programme if time permits. In this way it is hoped to overcome the distrust and indifference often shown by the native to hospital treatment, and to make impossible such a case as was operated upon this year at the hospital of a man from Pemba with a huge tumour who was found to have been suffering from a fractured jaw for five years. Opportunity will also be afforded for the improvement of diagnosis in rural dispensaries, in one of which I discovered a child with a fracture of the whole of the pre-maxilla being treated for gum boil. With opportunity for the regular visiting of villages and rural dispensaries it may be possible to pursuade more of these people to come to hospital where it is hoped that two or three dental beds may be reserved for them.

In addition to the almost universal dental caries and the rather less common gingivitis, the following conditions were observed. Amongst a large number of school children examined, Hutchinson's teeth were found in only four instances. In view of the belief in the wide spread infection of syphilis amongst the natives, this result was not anticipated. On the other hand, the number of cases of Vincent's Angina seen, 16 in Zanzibar since June and four in Chake Chake, is much more than was anticipated. One hundred and four cases of impacted lower third molars have attended since June, though this is a condition which is rare amongst other native tribes of which I have experience. This may be due to shortening of the mandible resultant upon the vast inter-racial marriages in Zanzibar in the past. Due no doubt to the same cause is the fact that no definite racial type of mouth or tooth was discovered amongst the school children although in the South of the Island, where the population is less mixed, a truer racial type was evident, and it was here that most of the supernumerary teeth seen were found. Necrosis of jaws is fairly common, chiefly due to caries, or teeth broken in the villages. Suppuration sets up with resulting necrosis which is so often either not treated in time, or treated inadequately, that when forced to the hospital on account of great pain, major operative treatment has to be resorted to.

Oral hygiene amongst the native population appears to be restricted to cleaning the teeth in the morning with a piece of chewed stick, the "mswaki". It does not appear to be very beneficial as it is used too dry and with too much gusto, and creditable as it is to clean the teeth in the morning, it is essential for effective dental hygiene that the teeth and oral mucuous membrane should be flushed free of debris the last thing at night. I hope to prepare a small booklet in Kiswahili for use at schools and dispensaries in which this procedure, with other simple principles of dental hygiene, will be emphasized. In the meantime certain pamphlets of the Dental Board of the United Kingdom are being issued to all schools.

Schools.—For four years now a great deal of my time has been spent in Zanzibar town schools, which are the largest in the Protectorate and I now have these schools under control. Next year I hope to give as much time as possible to rural schools, combining as far as possible schools, villages and dispensaries. It is very refreshing to find that quite a number of school children treated in 1934-1936 are coming back for further treatment of their own free will. It is another gratifying sign that whereas in 1934-1935 less than 40 per cent of the parents desired that their children should receive treatment, between 55 and 60 per cent during this year have expressed their desire for the treatment of their children.

Since my return from leave in June I have examined 1,278 new children at schools and found that 92 per cent require dental attention. Of these as stated above, 55 to 60 per cent agree to be treated, which provides work for nearly six months. The conditions found in the mouths of most school children are not pleasant, and only in a few cases would conditions found appear to be due to deficiency in the essential salts for calcification. The teeth are usually very hard, and the state of affairs found is without doubt due in the main to faulty or deficient oral hygiene. In 1935 the Education Department issued a circular to all schools laying down certain standards of oral hygiene to be applied to the children. The effect has been negligible, and the advice ignored in many cases by the school masters themselves. Until the terms of this circular are complied with, the state of affairs recorded will continue to exist, with the consequent demand upon the whole time work of a dentist to cure conditions which are easily preventable. No more effective measure in oral hygiene could be devised, nor one more calculated to conserve the dentists time for more profitable work, than the rigorous insistance that the terms of this circular should be complied with in every school in the Protectorate.

The following table sets out the work done during the period June-December, 1937. There is included an item of 1,352 extractions performed by one of the Senior Native Medical Assistants whom I had trained to carry on the Dental out-patient Department during my absence on leave up to June, 1937.

	Fillings.	Extractions.	Root fillings.	Scale and Polish.
Zanzibar Schools ...	198	234	14	4
School teachers ...	81	42	3	18
Pemba Schools ...	19	55	—	1
School teachers ...	16	4	—	2
Total ...	314	335	17	25
Civil servants including wives and families ...	100	39	9	16
Native out-patients:				
Zanzibar ...	—	1,362	—	—
Pemba ...	—	290	—	—
Done by Senior Native Medical Assistant ...	—	1,352	—	—
Done in villages ...	—	138	—	—
Grand Total ...	414	3,526	26	41

These figures do not include a large number of treatments given for gingival diseases or examinations.

The following table shows the schools examined and those requiring treatment.

Schools.		Number examined.	Number requiring treatment.	Free from dental disease.
ZANZIBAR:				
Govt. Central School	...	285	271	14
Govt. Girls' School	...	104	98	6
Dole	...	68	67	1
Chwaka	...	29	29	Nil
Donge	...	20	18	2
Gulioni	...	116	109	7
Kizimkazi	...	70	60	10
Kombeni	...	43	40	3
Makunduchi	...	97	82	15
Mangapwani	...	18	11	7
Mkwajuni	...	13	10	3
Muyuni	...	26	24	2
Mwera	...	73	63	10
Ndijani	...	67	58	9
Uzini	...	37	37	Nil
PEMBA:				
*Chake Boy's School	...	76	65	11
*Chake Girls' School	...	16	14	2
†Kangani	...	—	—	—
‡Kengeja	...	12	11	1
†Kiwani	...	—	—	—
‡Mkoani	...	4	3	1
‡Ngwachani	...	21	21	Nil
Uwondwe	...	51	50	1
‡Matangatwani	...	15	14	1
Wete Girls' School	...	17	15	2
Total	...	1,278	1,170 (92%)	108

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*All acceptances treated and school finished.

†Schools closed early for clove picking.

‡Now closed.

SECTION X.

(A) ANNUAL REPORT OF THE PATHOLOGICAL LABORATORY.

1. ZANZIBAR.

The work of the laboratory is summarized under the following headings :—

A.	Parasitology	F.	Public Health
B.	Serology	G.	Histology
C.	Bacteriology	H.	Autopsies
D.	Biochemistry	I.	Medico-legal
E.	General Clinical Pathology		

General Remarks.—During the year the Pathologist was transferred to Uganda on promotion and the laboratory was taken over by Dr. J. D. Robertson. The work of the laboratory continued on similar lines to those followed during 1936.

Examinations of blood films and of fæces for ova, and blood sera all show an increase in numbers, which is accounted for by the routine examination of school children.

The biochemical section also shows a large increase, the mainly to an increase in the number of sugar estimations in blood and urine.

In connexion with anti-hookworm activities, a number of native latrines were examined for the presence of ancylostome larvæ.

PATHOLOGICAL LABORATORY RETURN FOR THE YEAR 1937.

A. PARASITOLOGY.

Blood.—	Positive.	Negative.	Total.
Malaria P. vivax	253	7,237	
P. falciparum (11 crescents included)	1,252		
P. malariæ	26		
Undefined plasmodia	563		
	——	——	9,331
Micro-filaria (in malaria slides)	46	—	46
Spirochæta recurrentis	1	—	1
	2141		9,378

Fæces.—	Positive.	Negative.	Total.
Ancylostoma	2,508	1,900	
Ascaris	485		
Schistosoma mansoni	5		
Strongyloides	466		
Tænia saginata	3		
Trichuris	942		
Giardia intestinalis	5		
Entamœba histolytica	7		
,, coli	6		
,, unidentified	1		
	——	——	6,328

Urine.—	Positive.	Negative.	Total.
Schistosoma hæmatobium	162	336	498
Leptospira	—	1	1
			499
Smears from Vaginal ulcer for Schistosoma	—	1	1

B. SEROLOGY.

		Positive.	Negative.	Total.
Kahn's test	Positive	684	2,934	
	Doubtful	592		
		——	——	4,210
C.S. Fluid.—Kahn's test	Positive	2	6	
	Doubtful	1		
		—	—	9
Agglutination tests—				
Bact. typhosum	...	18	94	
Salmonella group	...	1		
		—	—	113
				4,332

C. BACTERIOLOGY.

		Positive.	Negative.	Total.
Blood Cultures.—				
Bact. typhosum	...	1	9	10
Trypanosomiasis (inoculation)	...	—	1	1
Fæces.—				
B. dysenteriæ—Flexner	...	26	110	
Sonne	...	6		
		—	——	142
Bact, typhosum	...	7	26	
Salmonella group	...	4		
		—	——	37
B. tuberculosis in direct smears	...	—	1	1
Urine.—				
Culture for Bact. typhosum	...	3	29	32
,, ,, other organisms	...	—	—	39
B. tuberculosis	...	—	1	1
Sputum.—				
B. tuberculosis in films	...	158	377	535
Culture for Pneumococci	...	1	—	1
Throat Swabs.—				
C. diphtheriæ	...	2	33	35
Culture for general examination	...	—	—	1
Pus.—				
Gonococci (Urethral and Prostrate smears)	...	310	386	696
,, (Vaginal and Cervical smears)	...	15	38	53
,, (Eye smears)	...	9	22	31
Cultural examinations	...	—	—	7
Nasal and Skin Smears.—				
M. lepræ	...	1	22	24
Leishmania donovani	...	1		
Nasal Swabs for Meningococci	...	—	3	3
Rectal smears for Gonococci	...	—	1	1
Scraping from finger for Fungus	...	—	1	1
Pathological Fluids.—				
Ascitic (Cytological and Bacteriological exam.)	...	—	—	2
Pleural (Cytological and Bacteriological exam.)	...	—	—	5
Synovial (Bacteriological exam.)	...	—	—	2
Cystic (Bacteriological exam.)	...	—	—	1
Chancre juice for Spirochæta pallida	...	—	6	6
				1,667

Vaccines.—		
Mixed	120 c.c.	
B. Friedlander	20 c.c.	
Staphylococci	20 c.c.	
Gonococci	2,515 c.c.	
		2,675 c.c.

D. BIOCHEMISTRY.

	Positive.	Negative.	Total.
Blood Glucose tolerance test			7
,, Lævulose tolerance test			1
,, Sugar estimation			455
,, Urea estimation			56
,, Calcium estimation			2
,, Cholesterol estimation			2
Van den Bergh's reaction			3
Fouchet's reaction for Bilirubin			1
Fractional test meals			16
URINE.—			
Quantitative estimation of Urea			55
,, ,, ,, Sugar			1
,, ,, ,, Albumin			2
,, Urea concentration test			2
Glucose tolerance test			7
Presence of Urobilin			2
,, ,, Albumin			11
,, ,, Sugar			436
,, ,, Ketone bodies			431
pH. estimations			8
Diastase index			2
FÆCES.—			
Occult blood			4
			1,504

E. GENERAL AND CLINICAL PATHOLOGY.

BLOOD.—			
Red cell, leucocyte counts, Hæmoglobin and Colour index			186
Differential counts			16
Blood grouping			2
Fragility of Red cells			1
C.S.F.—General examination			12
URINE.—			
General examination			71
Examination of deposits only			470
SPUTUM.—			
Curschmann's spirals	—	1	1
			759

F. PUBLIC HEALTH.

Water examinations (bacteriological)			121
Rats examinations (bacteriological)	—	953	953
			1,074

G. HISTOLOGY.

General:			
Cornea (inflammatory)			1
Normal Prostate gland			1
,, Cerebral cortex and dura			1
,, Stomach wall and gland			1
Benign tumours:			
Lymphatic cyst of Abdomen			1
Papilloma of bladder			1
Benign soft Fibroma			1
Fibrous polyp of bladder			1
Hetero-plastic bone (penis)			1
Malignant tumours:			
Squamous-celled carcinoma of cervix			1
Squamous-celled carcinoma of ulcer			1
Epithelioma of eye lid			1
Adeno-carcinoma of rectum			1
Epidermoid carcinoma of buccal mucous membrane			1
Mixed-cell sarcoma of leg			1
Spindle-cell sarcoma of eye			1
Spindle-cell sarcoma of ilium			1
Malignant Adenoma of bladder			1
Seminoma (lymphosarcomatous type) of testicle			1
			19

H. AUTOPSIES.

Causes of Death.	Positive.	Negative.	Total.
Asphyxia (suicide, strangulation or drowning) ...			3
Hæmorrhage and shock, following injury ...			9
Chronic nephritis, œdema of lungs ...			1
Myocarditis ...			1
Tuberculosis (following hæmoptysis) ...			1
Drowning (accidental) ...			2
Lobar pneumonia ...			1
Anæmia ...			2
Syphilis ...			1
			21

2. PEMBA.

I. MEDICO-LEGAL.

Blood stains (clothing, knives, etc.) ...		14
Blood Films.		
P. vivax ...	446	
P. falciparum ...	389	
P. vivax and falciparum ...	22	
Undefined plasmodia ...	108	
Negative ..	1,050	
		2,015
Urine Examinations.		
Schistosoma eggs ...	129	
Bile salts ...	10	
Sugar ...	34	
Albumen ...	165	
Negative ...	475	
		813
Fæces Examinations.		
Ancylostome eggs ...	408	
Ascaris ...	29	
Trichuris ...	46	
Multiple infestation ...	18	
Negative ..	367	
		868
Sputum Examinations.		
Acid fast organisms		
Present ...	25	
Negative ...	43	
		68
M. Lepræ Examinations.		
M. Lepræ ...	8	
Negative ...	36	
		44
Smears Examinations.		
Gonococci present ...	22	
Negative ...	17	
		39
	Total Examinations	3,847

(B) SCIENTIFIC.

Scientific papers published during the year 1937 by members of the Medical Staff:—

Duodenal Ulcer in Zanzibar, by Dr. S. M. Vassallo.
The East African Medical Journal, Vol. XIV, No. 3.

RETURNS.

Table I.

SANCTIONED ESTABLISHMENT, 1937.

Administration Division.

Director of Medical Services.

10 Clerks.

Special Appointments.

1 Senior Specialist Officer.

1 Dental Surgeon.

Medical Division—General.

1 Senior Medical Officer.
8 Medical Officers.
6 Sub-Assistant Surgeons.
2 Senior Native Medical Assistants.

1 Rural Health Investigator.
3 Asiatic Dispensers.
1 Asiatic Cook.

Nursing Staff.

1 Matron.

10 Nursing Sisters.

Sanitation Division.

1 Sanitary Superintendent.

4 Asiatic Sanitary Inspectors.

Laboratory.

1 Pathologist.
1 Laboratory Assistant (Asiatic).

1 Senior Laboratory Assistant (Asiatic).

Table II.

FINANCIAL.

		1937.	
A. Expenditure—Medical Department.		£	£.
Personal Emoluments	...	25,054	
Other Charges:—			
General Stores	...	1,283	
Drugs Dental and Surgical Requisites	...	2,918	
Maintenance of Patients	...	3,857	
Passages	...	1,647	
Sanitation Labour	...	1,332	
Grants to Lepers	...	119	
Miscellaneous Services	...	4,216	
			40,426
B. Expenditure—Municipality.			
Personal Emoluments	...	2,627	
Other Charges:—			
Equipments and Stores, Sanitation	...	285	
Sanitation Labour	...	4.386	
			7,298
C. Grants-in-Aid.			
Zanzibar Maternity Association	...	230	
			230
D. Revenue.			
Hospital Fees, Sale of Drugs, etc.	...	1,330	
Contribution from other dependencies towards the Quarantine Services	...	2.475	
			3.805

TABLE III.

RETURN OF STATISTICS OF POPULATION.

All the information available is in the Protectorate Blue Book.

TABLE IV.

METEOROLOGICAL RETURN.

The following is a brief summary of the more important meteorological returns available for the year, compared with the means for the year 1892-1936 in the case of Zanzibar and the mean for the years 1899-1936 in the case of Pemba.

	Zanzibar (town)		Pemba (Wesha)	
	1892-1936	1937.	1899-1936	1937.
Mean of daily maxima ...	84.4	86.4	86.3	86.7
Mean of daily minima ...	76.6	74.5	75.1	73.3
Mean of daily range ...	7.8	11.9	11.2	13.4
Mean ...	80.5	80.5	80.7	80.0
Rainfall (inches) ...	61.47	60.42	75.22	76.22
Rainy days ...	104	140	161	133

TABLES V AND VI.

Return of Diseases and Deaths for the Year 1937.

DISEASES	TABLE V					TABLE VI
	Remaining in Hospital at end of 1936	Yearly Admissions	Total Cases Treated	Total Deaths	Remaining in Hospital at end of 1937	All Cases including both In- and Out-Patients
1. Enteric Group—						
(a) Typhoid fever	...	2	2	...	...	2
(b) Paratyphoid fever	...	1	1	1	...	1
2. Typhus fever	...	...	...	...	...	...
3. Relapsing fever	...	2	2	...	...	2
4. Undulant fever	...	...	...	...	...	...
5. Small-pox	...	...	...	...	...	...
6. Measles	...	1	1	...	...	20
7. Scarlet fever	...	...	...	...	...	...
8. Whooping cough	...	...	...	...	...	94
9. Diphtheria	...	1	1	...	...	4
10. Influenza—						
(a) With respiratory complications	...	...	...	...	...	...
(b) Without respiratory complications	...	57	57	...	1	1,098
11. Cholera	...	...	...	...	...	...
12. Dysentery—						
(a) Amœbic	...	3	3	...	...	6
(b) Bacillary	...	22	22	3	...	24
(c) Unclassified	1	25	26	...	1	31
13. Plague—		50	51			
(a) Bubonic	...	...	...	...	...	...
(b) Pneumonic	...	...	...	...	...	...
(c) Septicæmic	...	...	...	...	...	...
14. Acute poliomyelitis	...	...	...	...	...	...
15. Encephalitis lethargica	...	...	...	...	...	...
16. Cerebro-spinal fever	...	1	1	1	...	1
17. Rabies	...	...	...	...	...	...
18. Tetanus	...	5	5	1	...	5
19. Tuberculosis of the respiratory system	29	118	147	45	22	182
20. Other tuberculous diseases	...	22	22	3	5	32
21. Leprosy	109	28	137	13	118	137
22. Venereal diseases—						
(a) Syphilis	10	75	85	4	10	1,062
(b) Gonorrhœa	5	58	63	...	...	1,458
(c) Other venereal diseases	...	2	2	...	...	72
23. Yellow fever	...	...	...	...	...	...
24. Malaria—						
(a) Benign tertian	1	27	28	...	...	485
(b) Subtertian	1	122	123	4	3	1,920
(c) Quartan	...	1	1	...	...	23
(d) Unclassified	1	96	97	3	...	6,373
25. Blackwater fever	...	2	2	...	...	5
26. Kala-azar	...	...	...	...	...	...
27. Trypanosomiasis	...	...	...	...	...	1
28. Yaws	...	15	15	...	1	4,188
29. Other protozoal diseases	...	...	...	...	...	...
30. Anyclostomiasis	20	214	234	10	22	12,202
31. Schistosomiasis	2	9	11	...	1	576
32. Other helminthic diseases	2	5	7	...	...	210
33. Other infectious and/or parasitic diseases	1	45	46	6	2	387
34. Cancer and other tumours—						
(a) Malignant	...	20	20	7	...	20
(b) Non-malignant	...	20	20	3	...	75
(c) Undetermined	...	...	...	...	...	...
35. Rheumatic conditions	...	7	7	...	...	510
36. Diabetes	2	28	30	3	4	46
37. Scurvy	...	...	...	...	...	...
38. Beri-beri	...	...	...	...	...	1
69. Pellagra	...	...	...	...	...	...
40. Other diseases—						
(a) Nutritional	2	40	42	...	9	450
(b) Endocrine glands and general	...	2	2	...	1	13
41. Diseases of the blood and blood-forming organs	...	11	11	3	1	1,044
42. Acute and chronic poisoning	1	4	5	1	1	109
43. Cerebral hæmorrhage	...	10	10	8	...	11
44. Other diseases of the nervous system	50	72	122	5	59	2,015
45. Trachoma	...	...	...	...	...	93
46. Other diseases of the eye and annexa	1	90	91	1	2	3,261
47. Diseases of the ear and mastoid sinus	...	10	10	...	...	2,184
48. Diseases of the circulatory system—						
(a) Heart diseases	2	38	40	11	3	128
(b) Other circulatory diseases	2	64	66	...	3	244
49. Bronchitis	...	71	71	1	2	6,454
50. Pneumonia—						
(a) Broncho pneumonia	...	21	21	10	...	37
(b) Lobar-pneumonia	3	139	142	42	9	159
(c) Otherwise defined	...	1	1	...	...	8
51. Other diseases of the respiratory system	4	49	53	1	4	495
52. Diarrhœa and enteritis—						
(a) Under two years of age	...	2	2	...	...	152
(b) Over two years of age	1	50	51	2	3	331

Tables V and VI.—*contd.*

DISEASES	Table V					Table VI
	Remaining in Hospital at end of 1936	Yearly Admissions	Total Cases Treated	Total Deaths	Remaining in Hospital at end of 1937	All Cases including both In- and Out-Patients
53. Appendicitis	...	14	14	1	2	21
54. Hernia and intestinal obstruction	17	172	189	14	17	317
55. Cirrhosis of the liver	4	4	8	4	...	14
56. Other diseases of the liver and biliary passages	...	19	19	...	1	114
57. Other diseases of the digestive system	8	190	198	16	3	19,158
58. Nephritis (all forms)—						
(*a*) Acute	...	7	7	2	2	17
(*b*) Chronic	...	24	24	7	1	39
59. Other non-venereal diseases of the genito-urinary system ...	32	463	495	20	26	2,837
60. Diseases of pregnancy, childbirth and the puerperal state—						
(*a*) Abortion	...	17	17	...	...	25
(*b*) Ectopic gestation	...	1	1	...	1	1
(*c*) Toxæmias of pregnancy	...	6	6	3	...	6
(*d*) Other conditions of the puerperal state	...	98	98	3	3	221
61. Diseases of the skin, cellular tissue, bones and organs of locomotion	50	882	932	30	53	36,155
62. Congenital malformations and diseases of early infancy—						
(*a*) Congenital debility (children under one year) ...	...	...	...	...	...	...
(*b*) Premature birth	...	1	1	1	...	1
(*c*) Injury at birth	...	...	...	...	...	...
(*d*) Others	...	87	87	1	...	96
63. Senility	112	222	334	136	68	407
64. External causes—						
(*a*) Suicide	...	...	...	...	...	...
(*b*) Other forms of violence	20	481	501	24	30	10,324
65. Ill-defined causes	22	166	188	19	16	3,57
66. Diseases of the lymphatic system	9	101	110	2	6	66
67. Diseases of the nasal passages and accessory sinuses ...	...	10	10	1	...	2,88
68. Ante-natal and child welfare-consultations	...	...	...	...	...	22
Total	524	4,673	5.197	476	516	125,54
Examinations	...	...	...	...		1,00
GRAND TOTAL	524	4,673	5,197	476	516	126,54

APPENDIX I.

REGISTRATION OF MEDICAL PRACTITIONERS, DENTISTS AND DRUGGISTS.

At the beginning and at the end of the year there were on the Register 24 medical practitioners, 9 licensed medical practitioners, 5 dentists and 19 druggists. Actually resident in the Protectorate at the end of the year there were 23 registered medical practitioners, 9 licensed medical practitioners, 2 dentists and 19 druggists of whom 10 registered medical practitioners, 8 licensed medical practitioners, 5 druggists and 1 dentist were in Government Service.

APPENDIX II.

CONTROL OF OPIUM.

The following are the particulars regarding opium addicts:—

	1935.		1936.		1937.	
	M.	F.	M.	F.	M.	F.
Number of opium addicts remaining from the previous year ...	42	16	41	15	39	16
Number of applications for permit during the year ...	5	—	1	—	2	1
Number of permits granted during the year ...	4	—	1	—	2	1
Number of permits refused during the year ...	1	—	—	—	—	—
Number of permits cancelled:—						
(a) Owing to death ...	—	1	2	—	—	—
(b) Owing to other cause ...	5	—	4	1	—	—
Number of opium addicts remaining at the end of the year ...	41	15	39	16	33	15
	ozs.		ozs.		ozs.	
Amount of opium issued to addicts during the year ...	392½		384½		360.3	
	Shs.	Cts.	Shs.	Cts.	Shs.	Cts.
Amount received in payment for opium issued ...	3,607	50	3,820	67	3,603	60